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WORKING PLAN

FOR

THE CUDDALORE FOREST DIVISION

1956-57 to 1965-66

BY

SRI E. S. THANGAM, B.Sc (Hons.), A.I.F.C.
Assistant Conservator of Forests.

Under the Direction of the Chief Conservator of Forests, Madras.

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GOVERNMENT OF MADRAS
1961

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INTRODUCTION.

1. The Cuddalore Working Plan Division was formed on the 25th of July 1955 to stock-map the ex-panchayat forests in the Chingleput, North Arcot, South Arcot and Salem districts and prepare working plans for those forests in accordance with the orders contained in the G.O. No. 1213, Agriculture, dated 12th May 1955. Since the revision of the working plan for Salem South Division was already taken up the ex-panchayat forests in Salem district were stock-mapped and were included in that working plan. For certain areas in the Salem North Forest Division, separate schemes were prepared along with the Salem South Working Plan. The ex-panchayat forest areas in the Harur taluk included in the Vellore West Division at that time were assigned to the Cuddalore Working Plan Division for stock-mapping.

2. The ex-panchayat forests thus stock-mapped fell under the following six forest divisions. Salem North division, Vellore East division, Vellore West division, Saidapet division, Chingleput division and Cuddalore division. Since regular working plans had already been sanctioned for the class I reserved forests of the Salem North, Vellore West and Vellore East Forest divisions separate schemes covering only the ex-panchayat forests of these divisions were prepared. As more than one working plan covered the forests of the Cuddalore and Saidapet divisions and as even the current working plan did not cover all the ex-panchayat forests, it was ordered that a comprehensive working plan for each of these three forest divisions, viz., Cuddalore, Chingleput and Saidapet divisions covering as well the Second Five-Year Plan Schemes should be prepared. This working plan came into existence in this way.

3. The Cuddalore Working Plan Division was closed down on 30th April 1957. By that time, the field work had been completed and the preparation of the working plans was on hand. The works in connection with the working plans were completed soon after.

4. The following staff helped me during the preparation of the working plan and Schemes :—

Range Officer	Sri Y. S. Kadachamani.
Foresters	Sri V. Ganapathi.
,, ...	Sri Z. D. Rajamanickam.
,, ...	Sri Md. Khassim.
,, ...	Sri S. Kannappan.
,, ...	Sri M. Swaminathan.
,, ...	Sri T. S. Srinivasan.
,, ...	Sri S. Ramanujam.
,, ...	Sri S. G. M. Hussaini.
Lower division Clerk	Sri Vasudeva Rao.
,, ...	Sri M. B. Deva Singh.
Tracer	Sri N. Gopalasamy.

I thank them for the co-operation extended to me in the preparation of the working plan and schemes.

5. The entire work was done under the guidance and direction of Sri V. S. Krishnaswamy, M.A., I.F.S., as Conservator of Forests, Development Circle and Chief Conservator of Forests. I express my gratitude to him for the kind help and guidance given to me during this work.

E. S. THANGAM,
Working Plan Officer, Cuddalore Working Division.

Cuddalore A.

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WORKING PLAN FOR THE CUDDALORE FOREST DIVISION

PART I

Summary of facts on which the proposals are based.

CHAPTER I—THE TRACT DEALT WITH.

SECTION I—NAME AND SITUATION.

Name.—This working plan deals with the forests situated in Cuddalore Forest Division extending over 108,654·88 acres and will be known as Cuddalore Working Plan revises the working plan for Chinglepit Forest Division (1949–50 to 1963–64) (sixty-four only) by Sri P. Venkataramany and the working plan for Vellore East Forest division (1949–50 to 1963–64) with regard to the portions of the forests falling within Cuddalore Forest Division.

2. *Situation.*—The Cuddalore Forest Division is spread over the whole of Vridhachalam, Cuddalore, Chidambaram taluks and parts of Kallakurichi, Tirukoyilur, Gingee and Villupuram taluks of South Arcot district. It lies between the north latitudes 11 9 to 12 6 andeast longitude 78 48 to 79 50 . The details with regard to the changes in the boundaries of the division since its constitution on 1st September 1956 are given in paragraph 2. It consists of five ranges, viz., Villupuram, Tirukoyilur, Ulundurpet, Vridhachalam and Panruti.

SECTION 2—CONFIGURATION OF THE GROUND.

3. *Topography.*—This forest division is for the most part at flat, plain, sloping very gently from the west to the sea on the east and also from the north to the south except for a strip of high ground running across the division from Pondicherry to Vridhachalam. There is a line of hills called the Mount Caper plateau, first west of Cuddalore which forms a part of bed of red laterite ground running from the north of Pondicherry southwards across Villupuram, Cuddalore and Chidambaram taluks.

There are backwaters on the sea coast by the sea water breaking into the water courses of streams and rivers. Some of these can be seen near Cuddalore. The division has no well-maked natural divisions. The alluvial valleys of the Ponneyar, the Gadilam, the Coleroon and the Vellar rivers differ in their soil from the country on either side of them. The sea shore is fringed with a belt of blown sand of varying width. The entire Chidambaram taluk in the south-east, however, is fully resembling more the landscape of the alluvial plains of the adjoining Thanjavur district.

4. *Regional types.*—The forests are generally situated in the plains and gently sloping country. Physiographically they can be divided into two main regional types, viz., the sea-board forests and the plains forests.

5. *Sea-board forests.*—The sea-board forests lie along the sea coast and are subjected to the ebb and flow of the tidal waters. The terrain is flat and is cut by the backwater intrusions. Only the fronts, viz., Pichavaram Reserved Forest and Kille Reserved Forest fall under this type. These are situated in the foreshores of Bay of Bengal at the confluence of Vellar with the sea. Both the reserved forests contain mangrove type of vegetation subjected to tidal inundations. Some casuarina plantations have also been raised in the interior.

6. *Plains forests.*—The country is gentle, with a general rise in level from the coast to the interior. Many of the Reserved Forests are flat without any undulations. Towards the interior, near Gingee and Kallakurichi, several hills rising up to 600 feet elevation are noticed.

SECTION 3—GEOLOGY, ROCK AND SOIL.

7. *Geology and Rock.*—The geological formations of the divisions are of some interest. Stratigraphically, the rock formations near Kallakurichi and Tirukoyilur belong to the Arachæchæan group and those near it towards the coast, belong to the cretaceous system. Further towards the east, the formation met with is the Cuddalore sandstone of Micene age which occurs between the Gadilam and Vellar rivers. This is followed by the recent alluvial deposits up to the cost line and on either side of the river beds. As a result of large marine incursions, interesting faunal assemblages are noticed especially near the coasts.

8. Beyond the Vellar river, near Vridhachalam, the cretaceous system emerges out of the alluminium and are over-lapped on the east by the Cuddalore sandstones. They are exposed in a strip of 15-mile long (north-north-east to south-south-west) and three to five miles wide between the two rivers, the Manimuktar and the Gadilam.

9. It is also probable that an Eocene sequence will be found in this area overlying the cretaceous rocks, possibly partly under the Cuddalore Sandstones of Miocene age.

10. Laterite formations are also noticed throughout the division in patches. It is well developed near Vadalur and Uthangalmangalam.

11. *Soil.—The types of soils met with are—*

(i) Red loamy soil.

(ii) Sandy soil—

(*a*) with meagre admixture of red soil; and

(*b*) without admixture of red soil.

(iii) Clayey soil—

(*a*) inland black cotton type; and

(*b*) coastal tidal type.

(iv) Kallar soil.

12. *Red loamy soil.*—This is the most common type of soil met with in the forests. Its depth varies from a few feet to even 20 feet at places. It is deep in the plains and becomes gravelly with rocky outcrops in hilly portions. Generally an impenetrable rocky bed is seen below these types of soil. Though the soil is lacking in humus content, it has fair moisture retentive capacity. From the wells found near the reserved forest in patta lands, water is met with at a depth of 15 feet to 20 feet. In some areas near Kadampuliyur, water table is met with only beyond 100 feet depth. This red soil, whenever it is deep, is considered to be eminently suitable for regeneration of cashewnut. The thousands of acres of cashewnut topes raised and managed by the private people are clear evidences of the richness of the soil.

13. *Sandy soil with meagre admixture of silt.*—This type of soil occurs in the unreserve lands adjoining the coast and some of the coastal reserved forests (i.e.), Porto Novo, Ariyakoshti, Killai reserved forests and Pichavaram reserved forests. The soil consists of sand with slight on meagre admixture of silt. The water holding capacity is poor. Water is stuck at 15′ for wells. In these areas, casuarina does not seem to attain the best dimensions. But casuarina plantations of average quality can be raised successfully.

14. *Sandy soil without admixture of soil.*—This kind of soil contains pure coarse and fine infertile sand without any silt or clay. The absence of clay fraction in this type which gives body to the soil, makes this soil unable to retain moisture. These soils are unfit for any regeneration operations. Such type of soil occurs in the Malattar river bed.

15. *Clayey soil—Inland black cotton type.*—These soils occur in scattered manner in some of the reserved forests, (e.g.), Krishnapuram Reserved Forest, Kattumailum Reserved Forest. Such soils contain more clay fraction than the sand and this lends peculiar qualities to it. The drainage is poor in these soils. Only certain type of vegetation flourish in these soils.

16. *Clayey soil—Coastal tidal type.*—While this soil is more or less similar in physical characteristics and composition, the rise and fall of the tides and the salinity of the water, result in the growth of certain special types of vegetation only. This type of soil occurs in portions of Pichavaram and Kille Reserved Forests. No artificial regeneration operations have been prescribed in these areas.

17. *Kallar soil.*—This type of soil occurs in patches in several of the reserved forests, (e.g.), Edaikal Reserved Forest. Kallar is defined as ‘ Soil efforescence ’ which appears on the surface of the Vsur or Alkali soils. It consists mainly of carbonates, sulphates and chlorides of sodium with any of them as chief salt: (Revised Glossary of Technical terms). The vegetation that comes up in these soils seems to depend on the alkali content of the soils. Where the proportion is high, nothing comes up and the area presents a white to grey appearance. In places with lesser alkali content, grasses and species like *Acacia latronum* and *Acacia arabica* come up. As a rule such areas have been excluded from regeneration operations, as artificial regeneration in these areas have not been successful in the past.

SECTION 4—CLIMATE AND RAINFALL.

18. *Climate.*—The climate is generally of coastal type, without extremes of heat and cold. But, towards the interior it becomes hotter and colder. While Cuddalore represents the coastal climate, Kallakurichi stands for the typical inland climate of hot and cold seasons. The meteorological data recorded for 1951 are given below for comparison.

Temperature.

	Mean of				
	Daily Maximum.	*Daily Minimum.*	*Highest recorded.*	*Lowest recorded.*	*Rainfall in inches.*
Cuddalore	89·9	75·3	103	62	44·79
Kallakurichi	93·3	74·3	107	60	35·02

April to June are the hottest months. If the mango showers and the south-west monsoon fail completely, the summer becomes quite hot. The coastal tracts are more humid than the inland areas. The climate is generally healthy except for the incidence of diseases like leprosy and filariasis, which occur commonly in coastal tract.

19. *Rainfall.*—The rainfall data recorded in the various stations located within this division for the last 10 years is given in Appendix II. It will be seen that the average rainfall varies from 33·92 to 44·37 inches. The total annual rainfall ranged from 25·16 inches from 18·76, the year of great famine to a maximum of 71·86 inches in 1884 the year of the heaviest floods.

20. From the rainfall data furnished, it can be seen that the coastal areas get more rainfall than the inland areas. This is due to the north-east monsoon which is the main source of rainfall to these tracts becoming drier as it blows from the coast to the interior, after shedding its rain. The reverse is the case with regard to the south-west monsoon, the inland areas getting more and the coastal areas less, as the direction of south-west monsoon is more or less opposite to that of north-east monsoon.

21. The incidence and duration of the mango showers of April are the real harbingers growth activity in the plants.

SECTION 5—WATER SUPPLY.

22. *Rivers and streams.*—As the general drainage of the land is towards the coast, all the rivers and streams in the division drain into the Bay of Bengal. The main rivers are the Gingee river, Pennaiyar, the Gadilam river, the Paravanar (Uppanar), the Vellar and the Coleroon.

23. The Gingee river, also known as Varaganadhi rises in the extreme north most corner of the Tindivanam taluk passes near Gingee, is joined on its left bank by the Kallar and the Pombai and passing through Villupuram taluk, debouches into the sea near Pondicherry. The Gingee river depends on local rainfall for its supply. This river enters this division only in the north-east corner just before flowing into the sea.

24. The Ponnaiyar rises in Mysore State in the Chennakesava hill east of the Nandidurg. After meandering through the Salem and North Arcot districts, it enters the South Arcot district at the north-east corner of Kallakurichi taluk where it receives the waters of the Tuninjelar flowering from the Tiruvannamalai taluk of North Arcot district. It flows across the Tirukoyilur taluk and along the boundary between Cuddalore and Villupuram taluk an dempties itself into the Bay north of Cuddalire New Town. The flow in the river is affected more by the rain that falls at its source than that which falls in this division. Sudden floods are quite a common feature of this river and as a result the causeway near Tirukoyilur on Cuddalore-Chittoor road and near Villupuram on Grant Southern Trunk Road can remain unfordable for several days. The floods dry up as rapidly as they appear.

25. The Gadilam river rises in the Kallakurichi taluk and flowing eastwards through Tirukoyilur and Cuddalore taluks falls into the Bay at Cuddalore.

26. The Ponnaiyar and the Gadilam are connected by a dry river course called the Malattur which seems to carry the surplus waters of the Ponniyar into the Gadilam.

27. The Paravanar has course in the Vridhachalam taluk and flowing between Cuddalore and Chidambaram taluks, strikes northwards and falls into the Bay by the mouth of the Gadilam. Towards the last stages of its concourse, it is called the Uppanar.

The Vellar is formed by the union of the Vashista Nadhi and Sweta Nadhi flowing from the Salem district. It follows the boundary for some distance between the Vridhachalam taluk of South Arcot district and Tiruchirappalli district, gathers the waters of the Manimukthar Nadhi, Gomuka Nadhi and Mayura Nadhi which drain the eastern slopes of the Kalroyans and passing through Chidambaram taluk, debouches into the Bay near Porto Novo.

28. The Coleroon, the surplus branch of the Cauvery river is more a river of the Thanjavur district. It flows on the southern boundary of Chidambaram taluk for short distance and reaches the Bay 6 miles south of Porto Novo.

29. *Anicuts.—The important anicuts in this division are—*

(i) The lower anicut across the Coleroon in the Thanjavur district.

(ii) The Toludur, the Palandorai and the Shatia tope anicuts across the Vellar.

(iii) The Tirukoyilur anicut across the Ponnaiyar.

(iv) The Vridhachalam and the Menathur anicuts across the Manimukta Nadhi.

(v) Tiruvendipuram and Vanamaderi anicuts across the Gadilam river.

30. *Tanks.*—The important major tanks in this division are the Perumal yeri in Cuddalore taluk and the Veernam yeri in Chidambaram taluk. The Wellington Reservoir of Vriddachalam taluk is also one of the major water spreads in this division.

31. *Water-supply.*—There are no important sources of water-supply within the reserved forests. Adjoining and within the reserved forests there are several tanks which have the nearby reserved forests as their catchment areas. These rainfed tanks contain water for six months in the year only, i.e., from July to December. These tanks are used to some extent to irrigate the paddy fields also. The cattle which graze in the reserved forests have these rainfed tanks only as for water-supply and no other water source is available.

32. There is one draw-well in the Tirukoyilur Range Office compound and it is maintained by the department. There are no more wells maintained by the department.

33. *Artesian wells.*—In the areas near Neiveli, an artesian water zone has been struck and several wells are dug to tap the artesian wells of depth 300 feet to 400 feet have to be sunk. The average cost of the well comes to be Rs. 8,000. The lignite is found near the artesian zone only. While no reserved forest falls actually within the commercially exploitable lignite zone.

SECTION 6—DISTRIBUTION AND AREA.

34. *General.*—The Cuddalore Forest Division consists of Class I Reserved Forests, Class III Reserved Forests, i.e., ex-panchayat reserved forests and un-reserved lands. The details of distribution of these forests in each category is given in the following statement.

(i) CLASS I—RESERVED FORESTS.

Name of reserved forest.	*Area in acres.*	*Date of taking over.*	*Government Order number and date.*
(1)	(2)	(3)	(4)
		Tirukoyilur Range.	
Pavanjipattu	4,313·88	..	No. 25, dated 18th May 1894.

Other Ranges—Nil.

(ii) CLASS III—RESERVED FORESTS (EX-PANCHAYAT RESERVED FORESTS).

		Panruti Range.	
Kangiruppu, Bit I	2,956	24th June 1949 ..	No. 1784, Development, dated 2nd April 1949.
Do. Bit II	2,579	Do. ..	Do.
Kille	638	30th August 1945 ..	No. 2292, Development, dated 13th June 1945.
Pichavaram and extension	2,717	Do. ..	Do.
	8,890		
		Tirukoyilur Range.	
Aviriyur	2,967	15th November 1959. ..	No. 1784, Development, dated 2nd April 1949.
Kaduvanur	4,065	Do. ..	Do.
Kanankadu	3,574	Do. ..	Do.
Pandur	951	22nd June 1949 ..	Do.
Rawathanallur	1,164	15th November 1949 ..	Do.
Sirupakkam	1,080	20th June 1949	Do.
Swamimalai	4,262	15th June 1949	Do.
	18,063		

Name of reserved forest.	*Area in acres.*	*Date of taking over.*	*Government Order number and date.*
(1)	(2)	(3)	(4)
		Ulundurpet Range.	
Alwamalai Reserved Forest	8,795	21st June 1949	No. 1784, Development, dated 2nd April 1949.
Kuttadi	1,700	5th November 1949	Do.
Kallamedu	1,030	23rd June 1949	Do.
Kottalamalai	2,817	5th November 1949	Do.
Kattumailur and extension	1,775	7th July 1949	Do.
Krishnapuram	6,044	28th October 1949	Do.
Magarur	1,263	15th June 1949	Do.
Nangur	1,694	12th July 1949	Do.
Porasakurichi	823	5th November 1949	Do.
Thottapadi	1,048	Do.	Do.
Varanjaram	874	Do.	Do.
Kuthakudi	1,295	23rd June 1949	Do.
Edaikal	3,390	22nd June 1949	Do.
	32,548		
		Villupuram Range.	
Adukam	2,000	16th June 1949	No. 1784, Development, dated 2nd April 1949.
Athipakkam	4,494	12th July 1949	Do.
Kunjaram	1,200	20th June 1949	Do.
Nayanur	1,639	15th June 1949	Do.
Nathamur, Bit I	4,500	13th June 1949	Do.
Do. Bit II	3,683	Do.	Do.
Rishivandiyam	3,278	5th November 1949	Do.
Sittal	1,518	Do.	Do.
Seedevi	2,772	12th June 1949	Do.
Tachampatty (portions in South Arcot district).	980	15th June 1949	Do.
Tachampatty (portions in North Arcot district).	1,236	26th April 1946	No. 2088, Development, dated 26th April 1946.
	27,300		
		Vriddhachalam Range.	
Ammeri	863	12th July 1949	No. 1784, Development, dated 2nd April 1949.
Narimanam	928	4th September 1949	Do.
Semakottai and extension	6,257	12th July 1949	Do.
Velangulam	1,261	Do.	Do.
M. Parur and *extension*	3,064	Do.	Do.
Karumangudi	1,100	6th July 1949	Do.
Kuppunatham	777	4th July 1949	Do.
			Do.
	14,250		

NOTE.—In G.O. No. 1081, Agriculture, dated 25th April 1956 the Reserved Forests italicised have been ordered to be handed over to the Neiveli Lignite Corporation, Neiveli. Actual handing over has not yet taken place.

(iii) UNRESERVE LANDS.

		Villupuram Range.	
Tiruvennainallur	562	1946	No. 3361, dated 2nd September 1946.
Graman	482	1946	Do.
Edayar	904	1946	Do.
	1,948		
		Panruti Range.	
Porto Novo	132	21st July 1946	No. 2292, dated 13th June 1945.
Ariyakoshti	171	Do.	Do.
Iruvelipattu	637	1946	No. 3361, dated 2nd September 1946.
Tiruthuraiyur	502	1946	Do.
Total	1,442		

35. The statement below furnishes the total areas of the various categories of forests in each range :—

Serial number Name of Range.	Class I R. Fs.	Class III R. Fs.	Unreserve lands.	Total for each Range.	Remarks.
1 Villupuram	..	27,300·00	..	27,300·00	..
2 Tirukoyilur	4,313·88	18,063·00	1,948·00	24,324·88	..
3 Ulundurpet	..	32,448·00	..	32,448·00	..
4 Vriddachalam	..	14,250·00	..	14,250·00	..
5 Panruti	..	8,890·00	1,442.00	10,332·00	..
Total ..	4,313·88	100.951·00	3,390·00	108,654·88	..

NOTE.—The areas of the unreserved lands given above are accurate as far as they are ascertainable only. They have not been verified.

36. *Beat charges.*—The various beat charges into which these forests are grouped are given in detail in Appendix III.

SECTION 7—STATE OF BOUNDARIES.

37. *State of boundaries.*—The Reserved Forests have been permanently demarcated by means of granite stone slab cairns and cleared lines of 6′ to 12′ width between the cairns. During the period when these reserved forests except Pavinjipatty Reserved Forest were under the management of the panchayats between 1923 and 1949, the boundaries were not satisfactorily maintained. Now most of the cairns are not having the correct serial numbers given in the maps. Some of them are missing or broken and the boundary lines are also overgrown at places. All these defects need immediate rectification and adequate provision for this work in Chapter X, Part II.

SECTION 8—LEGAL POSITION.

38. *Legal position.*—All the Reserved Forests are the absolute property of the State subject to certain rights and concessions and have been declared under Section 16 of the Madras Forest Act V of 1882 (one thousand eight hundred eighty-two). The unreserved lands under the management of the departmnt belong to the Revnue department.

SECTION 9—RIGHTS AND CONCESSIONS.

39. *Rights and concessions.*—The admitted rights of way and other concessions, if any, admitted at the time of settlement have been recorded in Section 16 notification of the Madras Forest Act V of 1882 with regard to each reserved forest.

CHAPTER II—THE FOREST.

SECTION 1—COMPOSITION AND CONDITION OF THE CROP.

40. *General.*—This Forest division mainly consists of ex-panchayat reserve forests which were under the management of the panchayats for more than two decades from 1923. The management under the panchayats having been far from satisfactory, the condition of the forests has been totally disturbed, resulting in severe retrogression types. Invariably, only scrub vegetation exists with a little variation in growth due to the edaphic factors. Well protected panchayat reserve forests like Varinjaram are more an exception than the general rule.

41. *Forest types.*—Since these forests are situated mostly on the plains, elevation does not play an important role in the type of the forests of this division. The factors that decide the forest types are : rainfall and moisture proximity to sea, edaphic factors and biotio influence.

42. According to the nature of vegetation found, the forests can be grouped into (1) coastal forests (e.g.), Pichavaram Reserved Forest, Kille Reserved Forest, Arivakoshti unreserve land and Porto Noyo unreserve land and (ii) inland forests (e.g.), all the forests other than the coastal forests. A detailed description of the various vegetational, seral and edaphic types are described in detail in the paragraphs that follow.

43. According to the classification done by H. G. Champion in his book ' A preliminary survey of the forest types of India and Burma ', the various types of forests met with in this division are :—

(i) Carnatic Evergreen forests—Group 6—Tropical dry evergreen forest.

(ii) Southern Cutch thorn forest—Group 5A— Southern thorn forest Type C1.

(iii) Cotton Soil *Babul* forest—Group 6—Tropical dry evergreen forests subsidiary edaphic types of dry Tropical forest-type evergreen.

(iv) Moist tropical seral forest types—

(a) primary seral types—

1. 1 S/1—Beach forest.
2. 1 S/2—Tidal forest.

44. *Carnatic evergreen forest.*—Champion describes this type as : ' A low forest 30–40 feet high but forming a complete canopy consisting mostly of small coriaceous leaved evergreen trees with short boles and spreading crowns. There is no marked differentiation of canopy layers between the shrubby underwood which includes many spiny species and the top canopy. A few species form the bulk of the crop which is however decidedly a mixed type, pure consociations being exceptional climbers are numerous. Bamboos are rare or absent. Grass is present, but not conspicuous. Most of the forests have been much influenced by felling, lopping and browsing and have become irregular with open patches, and the thorny and unpalatable species have largely displaced the climax vegetation. The most conspicuous genus is *Mimusops (Sapotaveæ) Memecylon (Melastomaceæ)* is also typical and common. *Diospyros* and *Eugenias* are usually present.

45. The overwood consists of : *Chloroxylon swietenia*, *Canthium didymum*, *Mimusops hexandra*, *Strychnos nuxvomica*, *Engenia* species, *Sapindus emarginatus*. *Buchanania latifolia*, *Zizyphus xylopyrus*, *Acacia leucophlœa*, *Atlantia monophylla* and others. The underwood, in well protected forests, consists of *Randia dumetorum*, *Carrisa carandus*, *Flacourtia sepiaria*, *Maba buxifolia*, *Grewia asiatica*, *Gmelina asiatica*, *Ixora parviflora*, *Webera corymbosa Dodonea viscosa*, *Scutia indica*, *Tadalia aculeata*, *Murraya exotica*, and pole and sapling crop of the overwood. The shrubby growth generally consists of *Memecylon edule* and in a few places, *Strobilanthes* species also. Grasses like *Cymbopogam* species *Aristida* species can also be seen in scattered manner. The climbers commonly met with are : *Acacia intsia Pterolobium indicum*, *Zizyphus œnoplia*, *Asparague* species, *Combretum* species, *Derris scandens* and others.

46. Only in a few patches in the interior along the stream banks and generally rather inaccessible to the human agencies only, we meet with forests typical of the description given in the last paragraph (e.g.) Alwarmalai Reserved Forest. The growth found invariably is in seedling or sapling stage only (e.g.) Kuppanatham Reserved Forest and Pavunjipattu Reserved Forest. Due to biotic influence resulted in repeated cuttings of these forests, considerable retrogression has set in and the forests cannot be seen in several degrees of retrogression. Invariably the overwood and the underwood are found in one canopy level. In some places, the evergreen species mainly have been to some extent replaced by the more xerophytic thorny species mainly as a result of biotic influence only (e.g.) Kuppanatham Reserved Forest. *Memecylon edule* is the most common undergrowth in these forests. *Strobilanthus* species occur only in very much sheltered localities.

47. *Southern cutch thorn forest.*—Champion in his book quoted above, describes this forest as ' An open low forest in which thorny usually hardwood species predominate, *Acacia* species being particularly characteristic. The trees usually have short boles and branching crowns which rarely meet. The usual height is 20 to 30 feet. There is usually a mixture of species (though relatively few in number), consociations being the exception rather than the rule. There is an ill-defined lower storey of smaller trees and large shrubs, mostly spiny and often with other xerophytic characters, extending down to low shrub growth of similar character. There is usually a thin grass growth which may appear fairly complete during the short moist season, but more or less the soil is bare. Climbers are few, also frequently showing xerophytic adaptations. The genus *Acacia* with a number of species and several other allied genera, is characteristic above all others. Fleshy *Euphorbias* are generally present and form a conspicuous constituent of the vegetation and *capparis* is also typical genus. *Opuntia* has become naturalised ever wide tracts of this type, but is not indigenous ".

48. The overwood generally consists of *Azadirachta indica*, *Acacia leucophloea*, *Chloroxylon swietenia*, *Bauhinia racemosa*, *Anogeissus la-tifolia*, *Cassia fistula* and others. The underwood consists of sapling and pole stages of the overwood and *Randia dumetorum*.

Carrisa carandus, *Canthium didymum*, *Dichrostachys cinerea*, *Fluggea leucopyrus*, *Cleistanthus collinus*, *Zizyphus xylopyrus* and others. The herbaceous growth is almost absent. The grasses met with are *Aristida* species Hetropogam species and others forming a thin cover. The climber commonly seen in these forests is *Zizyphus œnoplia*.

49. This is the most common forest type and occurs over large areas. This forest type can be seen in the reserve forests which are situated close to the villages and are on the roadside, as in Alwarmalai Reserved Forest, Edaikal Reserved Forest, Kuttadi Reserved Forest and Sithal Reserved Forest. The density of stocking and the quality of the species that occur vary with the intensity of maltreatment to which these forests are subjected. ' Schimper ' wrote that thorn wood land is often the effect of excessive cutting and browsing and so often not a climatic formation (Champion—*ibid*).

50. *Cotton soil babul forest*.—According to Champion, ' this sub-type is associated with black cotton soil. The general appearance of the forests is entirely dominated by one species. *Acacia arabica* which is markedly gregarious in habit and forms a denser cover than usual in thorn forests (biotic factors have also undoubtedly been in play). The few associated species occur mainly where the Acacia canopy is broken and there is usually very little under growth (grazing is heavy). There is a rather thin soil cover of grass.

51. In this type the overwood consists of *Acacia arabica*, *Dichrostachys cinerea*, *Acacia sundra*, *Acacia leucophloea*, *Phoenix sylvestria Ferronia elephantum*, *Dolichondrone crispa* and others. Occasionally, *Butea frondosa* and *Azadirachta indica* are seen coming from inside the bushes. As generally only one canopy level is noticed, there is little difference between the overwood and the undrwood. The herbaceous growth consists of *cassia tora*, *Cassia auriculata*, *Capparis grandis*, *Dodonea viscosa* and others. The grasses that one commonly found are : *Andorpogan* species and others.

52. This forest type occurs in several of the reserved forest at places where the soil is clayey and black cotton type with poor drainage (e.g.) Karmangudi Reserved Forest and Kattumailur Reserved Forest. Due to acute adverse biotic influence, these forests do not exist in their real state. In a heavily grazed area like portions in Krishnapuram Reserved Forest the ground is almost barren with scattered thorny growth. At places where the black cotton soil is mixed with ' Kallar ' soil, almost pure crop of *Acacia latronum* occurring.

53. *Beach forest*.—This forest has been described by Champion as : ' The habitat is an exposed one with pronounced characteristics. The soil is sea sand often brown and accumulating in low dunes, with adequate time from the shell fragments but poor in other mineral foods. It is very coarse, porous and dry at the surface, but the water table is usually only a few feet down : the water is fresher than might be expected but often brackish. Strong winds, often salt laden, act as desiccating agents with strong insulation and radiation from the bare sand rendering conditions pronouncedly xerophytic. The temperature is moderated by the proximity of the sea and by sea breezes. Rainfall varies with locality from 30 inches to over 200 inches; its influence is mainly seen in the rate at which the formation progresses towards the climatic climax.

54. The most characteristic species is the evergreen but very light foliaged *casuarina* which often forms an almost pure fringe on sandy beaches and dunes along the sea face. Scattered smaller evergreen trees occur with fewer deciduous trees and these in the absence of *casuarina* form the dominant canopy. These are numerous shrubs and where the undergrowth is light, maritime grasses (spinifex, etc.) and surface creepers are conspicuous binding the sand. In the depressions, which are swampy usually with saline water, the tidal species are poorly developed with a dense undergrowth; if the water is fresher, tall grasses (phragmites) occur.

55. The tree species commonly found in a scattered manner are *Borassus flabellifer*, *Lannaea grandis*, *Anacardium occidentale*, *Azadirachta indica*, *Ficus* species, *Calophyllum inophyllum* and others. The shrub growth is almost absent except for *Pandanus* species in depressions. The only grass found is *Spinifex squarrosus*. The area presents more an appearance of desolate sand waste than one of forest. In this type of forest, in suitable patches, plantations of *casuarina equisitifolia* and *cocos nucifera have been* raised. This forest type occurs in portions of Kille Reserved Forest and Pichavaram Reserved Forest.

56. *Tidal forest*.—The following extract taken from Champion's description of the tidal forests (Type 1 S/2) is typical of these forests. " Tidal forests vary so much in such short distances that a general description is difficult. The finest forest is found on the ground which is flooded at every high tide with only moderately brackish water and is an evergreen closed high forest. There may be an underwood of younger trees of the same species or of others such as *Ceriops*, two storied forests being of common occurrence owing to the prevalence of trees whose maximum height is only 15 feet to 30 feet mixed with others capable of further development. The soil in these forests is typically bare mud, though masses of regeneration may cover it locally. At higher levels, flooded

only in spring tides, there is more and more varied undergrowth. Nearer the sea with definitely salt water. Rhizophoraceæ and many smaller trees colonize the mud banks and flats. Species are here relatively few and most occur gregariously. Practically all are evergreen with simple coriaceæs leaves. Grasses or rare climbers are usually few but epiphytes are fairly rumsous. Some sepecies particularly among the Rhizophoraceæ grow on tilt roots or grow on Pneumatophores (Sonneratia). Vivipary is characteristic of the *Rhizophoras* and nearly all seeds on fruits are large but lighter than water.

57. *Rhizophoraceæ* are almost confined to the type and are most typical their special habit is the newly deposited mud banks submerged by tides every day. In addition there are a few genera, each usually with several species belonging to a considerable number of families, which are specially adopted to the unusual conditions, thus *Lythraceæ* (*Sonneratia*), *Verhenaceæ* (*Avicennia*), *Euphorbiaceae* (*Excoecaria*), *Leguminoseae* (*Cynometra*). Shrubs as opposed to small trees are few, *Acanthus* being the commonest. Actually the flora is a poor one and exceptionally uniform and widespread grasses are commonly absent."

58. The tidal forests occur in Kille Reserved Forest and Pichavaram and Extension Reserved Forests only. The types of forest that occur can be classified according to Champion into the " Tree mangrove forest type 1 S/2b ". This occurs in the river deltas along the edge of the waterways and sheltered muddy coasts over extensive areas, where accretion is in progress. The ground is daily flooded by salt water. The forest is typically a closed evergreen type of moderate height composed of trees specially adopted to survive under inundated conditions. Stilt roots are very typical (notably in Rhizophora); so also are leathery entire leaves, pneumatophores and vivipary.

59. The upper canopy consists of *Avicennia officinalis* which occurs gregariously in association with other trees *Rhiophora mucronta* and *Senneratia apetala*. In sheltered localities, these trees attain 60 feet to 80 feet height. While *Rhizophora mucranata* and Sonneratia apetala occur along the water fronts. *Avicennia officinalis* occurs in the interior only. In the lower canopy, along with the younger growth of the tree species that occupy the upper canopy, *Aegiceras majus*, *Brugeira cylindrocopsis*, *Excœcaria agallocha*, *Ceriops roburghiana*, *Luxmnitzera racemosa*, *Cynometra ramiflora* and others occur. *Acanthus illicifolius and Sueda maritima* are the common shrubs of these forests. The herbaceous growth consists of *Sesuvium portulacastrum*, *Salicornia* species. Arthrochinimum species and others. The commonly seen grass of the area is *Fimbrystylis* species. *Derris uliginosa* is the common climber.

60. Even though the forests are evergreen, *Avicennia officianilis* is found to coppice here and there. But, the regeneration in the area is mainly depended upon the seedling regeneration of *Avicennia officianalis* which is said to reach a girth of about 15 inches in 30 years. No accurate data appears to exist.

61. Towards the interior, in areas which are inundated only occasionally, the true mangrove disappears and only *Excoecaria agallocha* predominates with the shrub growth of *Sueda maitinea* and *Acanthus illifolius*.

62. Adjoining these areas, still further in the interior and in elevated areas, *Salvadora persica* and *Gataeva religiosa* occur with an occasional *Excoecaria agallocha*. The shrub growth comprises *Azima tetracantha*, *Gmelina asiatica*, *Fluggea* species *Dichorostrachys cinerea*, *Acacia sundra*, *Cassia auriculata* and others. *Sueda maritina* and *Acanthus illicifolius* are totally absent. The herbaceous growth consists of *cassia tora*, *Crotolaria verugosa* and others. *Daemia extensa* and *Solanum tribolatum* are some of the climbers commonly met with. The ground is covered with scattered growth of *Aristida* species.

Section 2—Injuries to which the crop is liable.

63. *Man.*—The existence of numerous villages in close proximity to the Reserve Forests and the unfettered rights which they enjoyed during the panchayat regime in those forests are the main reasons for the illicit removals of fuel, small timber and manure leaves from these reserved forests. The economic condition and the high illiteracy of the people do not make them realize the importance of the valuable forest lands situated in the close vicinity of the villages. They consider them vast inexhaustible resources of forest produce and exploit them to meet their daily needs. The licentiousness which the villagers enjoyed in those ex-panchayat Reserved Forests till they were taken by the department has created a set of people who depend on the removal and selling of the forest produce only. It is difficult for such people to slough off their old habits and turn a new leaf in spite of apprehending them often. The necessity for reinforcing the protection staff and more patrols of the Reserved Forests is emphasized here.

64. *Animals.*—The depredation caused to the Reserved Forests by over-grazing and goat browsing need no great emphasis. The present degraded condition of the ex-panchayat Reserved Forests themselves speak volumes about the perpetuation of those evil practices. These scrub jungles contain very little fodder grass worthy of mention. The hardening of the ground and the beginnings of incipient erosion can easily be noticed in these forests. The cattle feed on shrubby and other plants of fodder value. The scarcity of tree growth in the village porambokes and common land induce villages to graze their goats stealthily. Thus, in the scrub jungles, the real menace is the goat and not the smuggler. The details of the goat browsing offences given in the next paragraph clearly portray the situation. The acquisition of the station waggon was of great help to the District Forest Officer in organising surprise raids and in bringing the offenders to book.

65. *Forest offences.*—A list of the offences booked during the past few years in the composite Chingleput Forest Division is given n Appendix IV to ndicate the nature of offences involved. Eventhough the details furnished may not provide the exact number of forest offences occur in Cuddalore Forest Division, they probably indicate roughly the outer limit of the number of offences that may be expected.

66. *Fires.*—The high incidence of evergreen shrub growth as Memecylon edule, *Maba buxifolia* and others prevent the occurrence of any large scale fires in these forests. The statement below gives the fires that occurred during the past few years—

Serial number and name of reserved forest.	*Years of fire incidence and area in acres*								*Remarks.*
	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1 Alwarmalai ..	..	..	5	..	..	..	..	..	..
2 Swamimalai ..	..	5	..	..	..	..	..	..	..
3 Nathamur ..	..	..	..	..	..	..	..	1	..
4 Aviriyur ..	..	20	..	..	..	..	..	..	..
5 Krishnapuram ..	..	7	..	..	..	..	..	..	..
6 Kadavanur ..	..	15	..	..	..	..	..	..	..
7 Ravuthanallur ..	..	1/8	..	..	..	..	..	..	..

67. As fire is not a serious menace in these forests, no special protection operations are called for.

68. *Drought.*—In these low rainfall areas, drought is a serious menace to the proper growth of the plants. Notwithstanding the dessication of the soil and the retardation in the growth of the plants, it causes wholesale death of plantations in extreme cases of prolonged drought. In younger casuarina plantations, the duration of the drought will decide the extent of watering required for the casuarina plants.

69. *Wind.*—The hot, dessicating winds from the inland during the hot weather before the monsoon sets in cause death to the casuarina seedlings in the plantations. Like drought, these hot winds also decide the extent of watering required for the casuarina plantations.

70. *Noxious plants.*—Loranthus longiflorus is found to occur in casuarina plantations, but is not a serious menace. The climbers *Acacia intsia, Pterolobium indicum* and *Zizyphus oenoplia* are a real menace in the younger regeneration areas.

71. *Pests and diseases.*—The deteails of the various insects and pests that occur in the cashew and casuarina plantations are given in Appendix V.

SECTION 3—FAUNA.

72. *Wild life.*—The inadequacy of wild life in these forests is singularly conspicuous. Occasionally, panther, spotted deer, wild boar, porcupine and jungle fowls are seen in the relatively inaccessible jungles. Hares are commonly seen in these forests. Crocodiles are seen in the backwaters of the Vellar and Coleroon rivers. The *avi fauna* in these forests are much more varied than the ground-fauna. The presence of numerous irriga-tion tanks and the back-waters of the rivers provide suitable refuges for the birds. The Pichavaram Reserved Forest interspersed with the numerous tongues of the back water channels harbours numerous birds. The most commonly found birds are :—

Water snipes, Cormorants, Darters, Egrets, Storkes, Herons, Spoon-bills ibises, Pelicans and King-fisher.

73. *Hill tribes.*—As the forests are scrub type without any hills, no hill tribes live in these forests.

CHAPTER III—UTILIZATION OF THE PRODUCE.

SECTION 1—AGRICULTURAL CUSTOMS AND WANTS OF THE PEOPLE.

74. *Agricultural customs.*—Agriculture is the main occupation of the local population. Cattle breeding, sheep farming and goat rearing form the subsidiary occupations of the people to supplement their agricultural income. Wet cultivation is mostly done over areas served by canals and the ayacuts of the rain-fed tanks cattered all over the division. Paddy mainly and sugarcane are the most important wet crops. The bulk of the area is under dry cultivation. The major dry crops are Varagu (Paspalum scrobiculatum), groundnut (Arachis hypogea), Cholam (Soragham vulgare), Blackgram (Phas-eolus mungo) Dhal (Cajanus indicus), Gingelly (Sesanum indicum) and others. The people cultivate cashewnut trees also extensively along with dry crops in their fields. The high prices fetched is the main reason for the people for cashewnut cultivation. The cashewnut cultivation is mainly confined to the tract between Vridhachalam and Panruti only where the red soil is eminently suited for the species. Jack is also cultivated along with the cashewnut in this tract.

75. *Industries.*—South Arcot is an industrially backward district. The Sugar Factory at Nellikuppam is the only major industry in the district. The Neiveli Lignite Corporation has more or less completed its investigations, and shortly large scale mining operations are expected to be started. With the full development of the Lignite Corporation and its complementary units, the South Arcot district is expected to become one of the premier industrial districts of the State.

76. *Requirements of the local population.*—The principal demands of the local population on these forests are grazing firewood for domestic use and manure leaves.

77. *Grazing.*—The local cattle resort to the Reserved Forests only for grazing. As the forests of this division are mainly scrub type, grazing is an important activity in these forests. It is the main revenue producing item of the division and will continue to do so till the grazing stock in these forests grow into bigger trees.

78. The details of revenue collected during the last three years are furnished below—

Year.	Total number of cow units.	Revenue realized.		
(1)	(2)	(3)		
		RS.	A.	P.
1953–54	49,221½	13,953	10	0
1954–55	67,427	16,856	12	0
1955–56	76,418½	19,104	10	0
Average	64,389	16,638	5	4

79. As the total area of the division is 108,874 acres, the average incidence of grazing for the average number of cattle for the last three years is about two acres.

80. *Firewood.*—The reserved forests meet only to a very small extent, the firewood needs of the people, as there are only two Fuel Felling Series and one Casuarina Felling Series for the whole division. The demands of the people are met by the trees grown on the patta lands and cow dung cakes. When the conversion of the existing scrub jungle into better forests as contemplated in this Working Plan takes place, it is anticipated that the firewood needs of the people will be met to a greater extent.

81. *Manure leaves.*—The removal of manure leaf take place in the reserved forests situated closed to the wet lands only in all the ranges. Even though the manure leaf removal is not very intense in these forests, what little removed is quite pernicious to the existing scrub jungle. The species used for manure leaves are : *Dodonea viscosa*, *Wrightia* species, *Morinda tinctoria* and others.

SECTION 2—MARKETS AND MARKETABLE PRODUCE.

82. *General.*—Madras is the main market in addition to the local areas of the district, for the firewood of this division. The main market for cashewnut is foreign countries like the United States of America, where they are largely exported. Like firewood, the minor forest produce collected also find their way to Madras, after the local demands are met.

83. *Requirements.*—The quantity of firewood produced in this division being meagre, it can meet only a fraction of the requirements of Madras City and other towns. Similar is the case with regard to cashewnut, which are exported in large quantities to the foreign countries.

SECTION 3—LINES OF EXPORT.

84. *Railway.*—The important Railway routes of this division are :—

(i) Madras–Egmore to Chidambaram along the main line,

(ii) Villupuram to Pennadam along the chord line,

(iii) Villupuram to Tirukoilur on the branch line, and

(iv) Cuddalore Junction to Chinnasalem on the branch line.

The casuarina fuel is at times transported to Madras and other consuming markets by rail.

85. *Roads.*—This division is well served by a number of major and minor District Board Roads and village roads in addition to the portions of National and State Highways lying within the diviscn. The details of the Natonal and State Highways in this division are—

A. *National Highways.*—Grand Southern Trunk Road from miles 98 to 150.

B. *State Highways.*—(i) Cuddalore–Chittoor Road from miles 0 to 51.

(ii) Ulundurpet–Salem Road—From miles 36 to 74.

SECTION 4—METHODS OF EXPLOITION AND THEIR COST.

86. *Firewood.*—The fuel coupes are annually sold to the contractor, who exploit them by engaging the necessary mazdoors and other establishment. The details of cost of exploitation per ton of firewood are furnished below :—

(*a*) *Swamimalai Fuel Series*—

	RS.	A.	P.
1. Felling, billeting and stacking	6	0	0
2. Transport charges over a distance of 12 to 14 miles	6	8	0
3. Overhead charges	2	0	0
Total ...	14	8	0
Seigniorage rate for fuel ...	12	0	0
Grand total ...	26	8	0
Sale price ...	27	0	0
Net profit to contractor ...	0	8	0

(*b*) *Pichavaram Fuel Series* (*Panruti range*)—

	RS.	A.	P.
1. Felling, billeting and stacking	5	0	0
2. Transport over a distance of about 12 miles by boat	4	0	0
3. Overhead charges	1	8	0
Total ...	10	8	0
Seigniorage rate for fuel ...	12	0	0
Grand total ...	22	8	0
Sale price ...	25	0	0
Net profit to contractor ...	2	8	0

87. *Casuarina.*—The final felling coupes are generally sold in open auction to contractors, who engage the necessary labour and maintained the required establishment for exploiting them. The details of the cost of exploitation are furnished below :—

Markanam—

	PER TON.		
	RS.	A.	P.
(i) Felling, billeting and stacking	4	0	0
(ii) Transport charges from the coupe to railway station or town ...	6	0	0
(iii) Loading and unloading charges	1	0	0
(iv) Supervision charges	3	0	0
Total ...	14	0	0
Seigniorage rate based, leased and estimated yield of fuel ...	8	0	0
Grand total ...	22	0	0
Sale price ...	24	8	0
Contractor's profit ...	2	8	0

88. *Cashewnut.*—The right to collect the cashewnut from the cashew plantation will be leased out annually to the contractor, who will maintain the necessary staff and labour, exploit and market them. As such large-scale cashew plantations will be sold only a few years afterwards, it is difficult to forecast the cost of exploitation. Based on the current market rates, the details of the cost of collection are given below :—

	PER TON.		
	RS.	A.	P.
Collection of fruits from trees	16	0	0
Transport to forest depot over about three miles	3	0	0
Separation of fruits from cashewnuts and drying them	12	0	0
Transport to market at Panruti for sale over about 20 miles	16	0	0
Overhead charges, etc.	3	0	0
Total ...	50	0	0
	per ton		

The seigniorage value for the produce and contractor's profit will have to be added to the above amount.

89. *Minor forest produce.*—The cost of collection of the various items of minor forest produce are furnished below :—

1. Cashewnut (Panruti Range)—Rs. 5 to Rs. 6–8–0 per bag.
2. Tamarind (Tirukoyilur Range)— Re. 0–8–0 per bag unshelled.
3. Avaram bark (Tirukoyilur Range) Re. 0–12–0 per maund.

Section 5—Past and current prices.

90. *Fuel coupes.*—The price fetched by the sale of the fuel coupes in all the felling Series is furnished in Appendix VI. As the keen demand for firewood continued to exist throughout this period, high prices were realised. The fluctuation in the prices is due to the variation in the yield and the extent of competition in bidding at the time of sale.

91. *Casuarina plantations.*—The revenue realised by the sale of the casuraina plantations in the past are furnished in Appendix VII and paragraph 130 and 131. The ruling high prices for the firewood in the market resulted in the realisation of handsome revenue. The fluctuation in the prices fetched is more due to the variation in the stocking of the plantations than the competition in bidding at the time of sale.

92. *Minor forest produce.*—The details of revenue realised for the sale of the various minor forest produce are given in Appendix VIII. The variation in the prices fetched is mainly due to the quantity and quality of the crop obtained each year and the competition at the time of sale.

93. *Manure leaves.*—The details of revenue realised by the sale of manure leaves in Tirukoyilur Range are given below :—

Year. (1)	Quantity — Cart-load. (2)	Quantity — Head-load. (3)	Value in (4) Rs.	A.	P
1949–50	177	20	219	12	0
1950–51	19	Nil	23	12	0
1951–52 to 1953–54		Nil			
1954–55	87	Nil	65	4	0
1955–56		Free removals.			

93. A. There was no demand for manure leaves in the other ranges.

CHAPTER IV—ESTABLISHMENT AND LABOUR.

SECTION 1—ESTABLISHMENT.

94. *Establishment.*—The details of the existing executive and ministerial establishment are furnished below :—

Strength of establishment in Cuddalore division.

Name of the office. (1)	*Assistant Conservator of Forests, Rs. 300—40/2—500—50/2—700* (2)	*Range Officer, Rs. 125—5—175—10—255.* (3)	*Foresters, Rs. 50—3—65—2—85.* (4)	*Forest Guards, Rs. 20—1—30.* (5)	*Forest watchers, Rs. 12.* (6)	*Head Clerk, Rs. 80—3—95—5—110 and Supervising allowance Rs. 5.* (7)	*Accountant, Rs. 80—3—95—5—110.* (8)	*Upper Division Clerk, Rs. 80—3—95—5—110.* (9)	*Lower Division Clerk, Rs. 45—3—60—2—90.* (10)	*Typist, Rs. 45—3—60—2—90 and Allowance Rs. 10.* (11)	*Draughtsman, Rs. 55—3—100.* (12)	*Peon, Rs. 18—1—25.* (13)	*Office watcher, Rs. 12.* (14)
1 District Forest Office.	1	..	..	..	..	1	1	..	4	1	..	2	1
2 Range Office, Panruti.	..	1	4	4	4	..	..	..	1	..	..	1	..
3 Range Office, Ulundurpet.	..	1	6	11	8	..	..	..	1	..	..	1	--
4 Range Office, Vriddhachalam.	..	1	4	3	2	..	..	..	1	..	..	1	--
5 Range Office, Tirukoyilur.	..	1	4	8	4	..	..	..	2	..	..	1	..
6 Range Office, Villupuram.	..	1	3	11	8	..	..	..	1	..	..	1	..

The existing staff is considered adequate.

SECTION 2—LABOUR.

95. *Labour.*—There was no difficulty in procuring labour for the various regeneration operations carried out. By properly spacing out the various regeneration and other operations, the works were carried out in time without any difficulty for labour.

96. *Labour wages.*—The details of the current daily wages paid for the various kinds of mazdoors is given below :—

(i) Male—Re. 1–0–0.

(ii) Female—Re 0–10–0.

(iii) Boy—Re. 0–10–0.

CHAPTER V—PAST SYSTEMS OF MANAGEMENT.

SECTION 1—HISTORY OF THE FORESTS.

(i) Period up to 1900.

97. *General.*—The East India Company came into possession of the South Arcot district in 1801 and nothing much was done either for improvement or protection for several years. People were at liberty to cut and remove trees and graze cattle as they liked.

98. *Introduction of Seigniorage system.*—Though trifling sums were collected at times for cutting trees, the collection of seigniorage rates for certain trees of and above a fixed girth was brought into force only in 1860.

99. *Jungle Conservancy department.*—The jungle conservancy rules were introduced between 1861 and 1868. In 1867, Captain Campbell Walker made the first attempt to separate the areas that are to be permanently maintained as forests, with the main object of supply of firewood for the railways. Simultaneously attempts were made to raise casuarina plantations in the Malattur River bed, and the coasts near Cuddalore and Porto Novo from the jungle conservancy funds.

100. In 1870, a Forest Officer was appointed under the jungle conservancy funds. He looked after casuarina plantations and selected reserved forests for the jungle conservancy department, for providing fuel for the villages. The forests were in general classified into the Imperial and Jungle conservancy areas. In the jungle conservancy areas, the management was not quite effective and only goat browsing and large scale tree cuttings were prohibited.

101. *Reservation of forests.*—With the passing of the Madras Forest Act V of 1882, systematic conservancy of the forests was inaugurated. By the time this work was completed, already considerable damage had been done to the forests in the plains areas, by goat browsing, indiscriminate cutting of trees and encroachments. Very little of real forests actually came to the Government.

(ii) Period 1900 to 1924.

102. *General.*—Certain areas were leased to the contractors for extracting a limited quantity of firewood and small timber by working them under the 'coppice with standards' system. Grazing was also permitted. The felled areas were fenced with brushwood, and closed to grazing for five years to allow the coppice shoots to come up. The main minor forest produce items collected from these forests were manure leaves, cashewnuts, tamarind, soapnuts, silk cotton date?leaf ribs for making brooms, baskets and mats, and shells from the backwaters. In general the management of the forest was one of mere protection without any concerted attempt to improve them. An attempt to raise casuarina plantations along the coast on a large scale at Rs. 32 per acre was made early during this decade. This was given up later, as the ryots began to raise extensi ve plantations on private lands. The South Arcot Forest Division was formed during the first decade of this century.

103. The rapid reservation of the forest areas brought in complaints that the reserved forest lines were too close to fields under cultivation and that too many restrictions were placed on the people in the matter of obtaining small timber and firewood from the reserves and grazing. In the course of some years, these clamours and complaints mounted up and they were directly responsible for the creation of the panchayat forest.

(iii) Period 1924 to 1955–56.

104. *Panchayat management.*—During 1925, a special officer was appointed to examine and classify the forests of the then Madras Province into three classes. Of these, the first two were to be permanently retained under the control of the department and the third which was intended to supply the requirements of the ryots was to be placed under the ryots' management. The panchayat forests came into existence in this way.

105. As only a few forests remained in the South Arcot Forest Division after the creation of the panchayat forests, the South Arcot Forest Division was closed down and the remaining few forests were added on to the neighbouring forest divisions.

106. *Administration of the panchayats.*—The carving out of the panchayat forests sounded the death-knell of these forests. All that were conserved and built up from 1882 were lost. Sir Daniel Richmond, the then Chief Conservator of Forests, was against this *coupe-degrace* in the administration of forests. He took a number of photographs of these forests before handing them over to the panchayats and gave them to the Board of Revenue to prove the indiscretion of this decision. These forests were again returned to the Department one after another during the period 1946 to 1949. The vrestigial condition in which they were resumed charge by the Department, was a no mean tribute to the maltreatments to which they were subjected and the vandalisms perpetuated on them. Sir Daniels' vision came only too true. A scrub jungle not worthy of the name, with extensive uncontrolled fellings and mutilated stumps, overgrazed by cattle, illicitly browsed by goats and not the forests which they took from the Department were returned to the Department. Yet, their condition was not beyond repair and so concerted efforts were immediately organised to restore them to their pristine condition to as large an extent as possible.

107. *Coastal Casuarina Division.*—During the second world war, the firewood demand at Madras rose suddenly due to large infiltration of population into the City. This was accentuated by the short supply of coal to the brick-kilns and coal and diesel oil for industrial purposes for which firewood was used as substitutes for coal. The popularisation of producer gas units for motor vehicles also necessitated large scale production of charcoal from firewood. Consequently firewood was not available upto the requirements and the price also shot up high. The Government introduced firewood control early.

108. The position with regard to the areas in North of Madras was satisfactory and also large scale plantations. As similar facilities did not exist with regard to the areas lying South of Madras, a coastal casuarina division was considered necessary to develop the casuarina plantations in the areas South of Madras. To start with an Assistant Conservator of Forests with the necessary staff was posted on special duty for selection of areas suitable for planting casuarina in G.O. No. 2183, Development, dated 22nd May 1944. During 1944–45, 449 acres were planted in seven localities.

109. *Chingleput Forest Division.*—In 1945 based on certain proposals submitted to the Government in G.O. Ms. No. 2292, Development, dated 13th June 1945, granted the expansion of the coastal casuarina division into a territorial Forest Division with headquarters at Chingleput and with jurisdiction over certain Panchayat Reserved Forests and unreserves in Chingleput and South Arcot districts. The Chingleput Forest division was formed on 16th July 1945, with four Ranges, viz., Chingleput Range, Tiruporur Range, Sriperumpudur Range and Marakanam Range. In G.O. No. 4014, Development, dated 24th October 1946 the Government transferred some more panchayat forests to extend the casuarina plantations. On 24th May 1947, the fifth range, viz., the Tirukoyilur range was formed according to the orders passed in G.O. Ms. No. 485, Development, dated 12th February 1947 and on 17th February 1947, the Satyavedu Range of Nellore Forest division was transferred to the Chingleput Forest division. In Government order No. 884, Development, dated 24th February 1948, No. 2088, Development, dated 2nd April 1949, the balance of the panchayat reserved forests in the Chingleput and the South Arcot revenue districts were transferred to the department and they were included in the Chingleput Forest division.

110. *Territorial changes.*—On 15th May 1954, the territorial changes were reconstituted into six ranges as Satyavedu, Trivellore, Chingleput, Marakanam, Tirukoyilur and Vriddachalam. As it was contemplated to rehabilitate the ex-panchayat reserve forests under several schemes of the second five-year plan, the following three special divisions were formed within and in addition to jurisdiction of the Chingleput territorial division.

Serial number and name of the division (1)	*Headquarters.* (2)	*Authority.* (3)
1 Cashew division	Adayar	G.O. Ms. No. 1600, Agriculture, dated 28th June 1956.
2 Fodder and Pasture Division	Chingleput	G.O. Ms. No. 1761, Agriculture, dated 16th July 1956.
3 Rehabilitation Division	Cuddalore	G.O. Ms. No. 1797, Agriculture, dated 20th July 1956.

111. The Cuddalore Rehabilitation division was formed on 1st September 1956 with headquarters at Cuddalore. At the time of the general reorganisation of the Forest divisions in the State the Government ordered in G.O. No. 2937, Agriculture, dated 21st December 1956, the amalgamation of the existing territorial and special divisions and the reconstitution of the following territorial divisions in order to avoid overlapping jurisdiction and to have effective control :—

Name of division—Headquarters.

1. Saidapet—Madras.
2. Chingleput—Chingleput.
3. Cuddalore—Cuddalore.

The fodder and pasture division was not affected by this reconstitution of the divisions.

112. The Cuddalore Forest division with headquarters at Cuddalore was formed on 1st February 1957 in accordance with the orders contained in G.O. No. 2937, Agriculture, dated 21st December 1956 with five Ranges as below :—

Name of the Range—Headquarters.—

Tirukoyilur—Tirukoyilur.
Panruti—Panruti.
Vriddachalam—Vriddachalam.
Ulundurpet—Ulundurpet.
Marakanam—Marakanam.

113. In order to have proper distribution of work in all the Ranges, the Villupuram Range with Villupuram as headquarters was formed on 1st April 1957 in accordance with the orders passed in Government Memoradum No. 2464-C III/57-1, dated 9th February 1957. As the headquarters for Marakanam Range was situated in one corner of the Range, the headquarters was shifted to Tindivanam on 1st April 1957 and the Range was called Tindivanam Range, in accordance with the orders issued in Chief Conservator's Proceedings Mis. No. 48/57, dated 4th March 1957. The Cuddalore Forest Division contains five ranges with the headquarters as shown below :—

Name of the Range—Headquarters.—

Villupuram—Villupuram.
Tirukoyilur—Tirukoyilur.
Ulundurpet—Ulundurpet.
Vriddhachalam—Vriddhachalam.
Panruti—Panruti.

SECTION 2—PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS.

A. Period up to 1944–45.

114. *General.*—The management of the Forests upto the time of formation of the village panchayats have been indicated in the last section itself along with the history of the forests. During that period, the management of these forests was more one of exploitation and maintenance than that of conservation and development.

115. *Panchayat management.*—The forests handed over to the village panchayats were managed by Committees consisting of not less than five members elected from the cattle owners of the village. The President of the Panchayat Committee was elected by its members for a term of three years. As stipulated in Board's standing order No. 195. the members of the Panchayat executed an agreement in which one of the conditions was to pay a fixed amount in respect of each Panchayat as compensation to Government. This amount was fixed by the Government in relation to the grazing fees collected by the Panchayats. The main duties of the Panchayats were protection, collection of grazing revenue and carrying out improvements as repairs to water sources, dibbling of *Cassia auriculata* seeds, eradication of prickly pear, planting 25 trees and others.

116. Watchers were employed to protect the Panchayat forests and they were paid from the Panchayat funds. A graded system of pay ranging from Rs. 4 to Rs. 10 was fixed to induce them to do good work. As even this low pay was not paid to them at times, they resorted to malpractices and thus the protection of the forests left much to be desired.

117. The supervision and control of these forests rested with the Revenue Divisional Officers subjected to the general overall control of the Collector. Before 1939, a few Deputy Tahsildars were posted to supervise the panchayat work. Due to their ignorance of the technical knowledge, the forests deteriorated and the work was entrusted to an experienced Forest Ranger as ordered in G.O. Ms. No. 3153, Development, dated the 20th December 1938.

118. The Panchayat committees tried to work these forests according to the Working Plans current at the time of their transfer. The fuel coupes were classified as major and minor. In major coupes, the rotation adopted was 25 to 30 years. The silvicultural system followed was simple coppice with the retention of fruit bearing trees. The coupes were closed to grazing for a period of five years after felling. The revenue from the fuel coupes was remitted to the Government who gave a proportionate amount as compensation for the loss of grazing revenue due to the closure of felled coupes for grazing. No cultural regeneration operations were done and the coppice growth covered the area. The minor fuel coupes were formed and sold by the panchayats where no major coupes existed. The areas of these minor coupes varied from 10 to 15 acres and the revenue realized by the sale of minor coupes went to the panchayats. The removal of manure leaves from these forests was controlled on three year cycle. The annual areas were sold and exploited. Usually, the removals were not confined to annual coupes only. It was spread all over the area. The grazing fees, which were the main source of income to the Panchayats were collected by levying different grades of grazing fees according to the quality of grazing available and the animal graze. It varied from four annas for sheep to two rupees for a buffalo. These grazing fees were also not uniform and varied from Panchayat to Panchayat. Very little improvement to grazing, except the deepening of a few tanks and wells was carried out. On the whole, the general financial position of these Panchayats was satisfactory and all of them were working at a profit.

119. During the panchayat management the condition of the forests had deteriorated considerably partly due to destructive methods of exploitation and partly due to mismanagement. Many of the forests which supported dense forest growth formerly turned into open scrub jungle. Membership of the panchayat was keenly sought for political or personal ends. Mismanagement was either deliberate for selfish ends or was the result of the Presidents and members of the panchayat being too preoccupied with their other affairs to be able to devote adequate attention to their trust and more often it was a combination of both factors. The panchayatdars even if they had the time and interest for this work, they were hardly fully equipped for the job on hand. Regeneration was restricted to the minimum of planting 25 trees per annum. Promiscuous goat browsing not only destroyed the existing tree growth but did not give a chance for regeneration to come up. The shortsighted and insular panchayats were interested neither in preservation and planting for the posterity nor in anything beyond the immediate legitimate or illegitimate-benefits to themselves. The necessity to look after these forests in the proper way under suitably trained officers was more keenly felt and resulted in taking over these panchayat forests by the Forest Department after some years.

B. Period from 1944–45 to 1948–49.

120. *General.*—During this period, the major activity was that of raising casuarina plantations. In addition, a few small scale plantations of miscellaneous species were raised. In this period, the village panchayat forests reverted to the Department one after another and this process was completed in a few years after this period. Regeneration areas were taken up in these panchayat reserves also whenever necessary.

121. *Casuarina plantations.*—The details of the plantations raised are given below :—

Year of regeneration.	*Name of forest.*	*Area in acres.*
(1)	(2)	(3)
1945	Edayur Unreserved land	47
	Kille Reserved Forest	48
	Tiruvennainallur Unreserved land	41
	Iruvelipattu Unreserved land	73
	Tiruthuraiyur Unreserved land	119
	Porto Novo Unreserved land	123
	Gramman Unreserved land	46
1946	Athipakkam Reserved Forest	100
	Kille Reserved Forest	56
	Ariyakoshti Unreserved land	82
	Pichavaram Reserved Forest	83
	Edayur Unreserved land	69
	Tiruvennainallur Unreserved land	75
	Grammam Unreserved Land	96
	Iruvelipattu Unreserved land	79
	Portonove Unreserved land	30
	Tiruthuraiyur Unreserved land	110

NOTE.—Since these data relate to the period prior to that of the Working Plan for the Chingleput Forest Division, 1949–50 to 1963–64 by Sri P. Venkataramany and all the relevant records are not readily available, the details given above are not complete.

122. As large-scale failures were noticed during the first few years, the plantations were inspected by the Chief Conservator of Forests in 1947 and it was ordered that the annual regeneration area should be reduced to about 130 acres along the coastal tracts. Even though the District Forest Officer was ordered to concentrate on replacing the casualties in the older plantations in 1947 nothing much could be achieved. The main reasons for such large-scale failures are :—

(i) *Unsuitable regeneration areas.*—The regeneration areas selected for planting casuarina did not have adequate depth of soil and the water table was quite low. In addition, the areas selected for regeneration like Malattur river-bed contained pure coarse sand without any clay fraction to retain the soil moisture.

(ii) *Incorrect technique.*—The technique adopted consisted in clearfelling the scrub jungle digging one foot cube pits at 7 feet by 7 feet planting the seedlings about July to October and watering the seedlings till the next June. In many cases, the plantings were extended up to December, resulting in large casualties. In the scrub jungle, the weed growth was a menace and frequent weedings were necessary to keep them down. As the areas were neither hoed or ploughed the root competition killed the plants in no time. In most cases the plantations were not fenced. When effective fencing was erected for the plantations from 1950 onwards, nearly cent per cent success was obtained.

(iii) *Inadequate attention by the staff.*—Since the staff consisted mainly of temporary members and as the field staff of Forest Guards and Foresters were inexperienced new recruits, adequate care and attention could not be bestowed by them.

123. *Miscellaneous plantations.*—Several plantations of miscellaneous species were raised on an experimental scale mainly in the Malattar river-bed at several places in the failed casuarina plantations. The details of the regeneration operations are given below :—

(i) In 1948 in Iruvelipattu unreserve land, *Poinciana elata* cuttings of 6 feet long and 3 inches to 6 inches diameter were planted 3 feet deep at 30 feet by 30 feet over 2 acres in Octobr–November and the cuttings were watered on the planting day.

(ii) In 1948 in Iruvelipattu, Gramam and Edayar unreserve lands, pot plants of *Prosopis juliflora Inga dulce* and *Albizzia lebbeck* were planted at 12 feet by 12 feet in one foot cube pits over 5 acres. ...

(iii) In 1948, in Edayur unreserve land *babul* was raised over 2 acres by the Guntur method. After ploughing the area thoroughly, $57\frac{1}{2}$ bags of Babul seeds (four cart-loads) were fed to 200 goats penned for five nights in the area. The excreted seeds were ploughed again during the North-East monsoon in 1948.

124. All these plantations failed after a year or two. The main reason for the failure of the plantation in (i) and (ii) experiments is the unsuitability of the soil, which consisted only of pure sand without the clay fraction which gives the ' body ' to the soil. The reason for the failure of the plantation in experiment (iii) is due to not fencing the area properly and looking after them.

C. Period from 1949–50 to 1955–56.

125. *Working plans.*—The first working plan for the Chingleput Forest Division was written by Sri P. Venkataramany for the period 1949–50 to 1963–64 excluding the Satyavedu Range of Nellore Forest Division which was already covered by the Working Plan for the Nellore Forest Division by Sri M. H. Krishnaswamy for the period 1942–43 to 1957–58. In the newly constituted Cuddalore Forest Division Pavungipattu Reserved Forest of Vellore East Division was also included. This Reserved Forest was covered by the Working Plan for Vellore East Forest Division by Sri N. Ramakrishnan. The details for each working plan are dealt with separately below :—

(*a*) CHINGLEPUT WORKING PLAN.

126. The Chingleput Working Plan dealt with separately, the Reserved Forests in the South Arcot and Chingleput revenue districts. Even among the Panchayat Reserved Forests in South Arcot district, only some were under the management of the Department and the rest were sill under the village panchayat management. The Chingleput Working Plan covered both these forests.

1. *Reserved Forest under the Department.*

127. For these forests, the following working circles were constituted.

(i) Working Plan for the casuarina conversion working circle.

(ii) Working Plan for the Fuel Working Circle.

(iii) Working Plan for manure leaf working circle.

(iv) Working Plan for Minor forest produce working circle.

(v) Working Plan for grazing working circle.

(vi) Working Plan for protection working circle.

128. In the following paragraphs, the extent to which the prescriptions made in each working circle were implemented and the changes made therein are discussed in detail for each working circle for the Reserved Forests that are located within the Cuddalore Forest Division. The names of the Reserved Forests are :—

Pichavaram and Extension Reserved Forest, Kille Reserved Forest, Attipakkam Reserved Forest and the unreserved lands of Porto Novo, Ariyakoshti, Tiruvennainallur, Gramam, Iruvelipattu, Edayar and Tiruthuraiyur.

129. *Casuarina conversion working circle.*—Out of the two fuel series formed in this working circle, only the Tirukoyilur Range fuel series is located in this. The details of areas included in the Fuel Series are :—

	ACS.
Kille Reserved Forest	159
Pichavaram Reserved Forest	35
Total ...	194

130. *Area worked.*—The details of the areas prescribed for conversion and those actually done are given in the statement below :—

Prescribed.				Done.				
Year.	*Name of reserve forest.*	*Details of area.*	*Area to be planted.*	*Year.*	*Area taken up.*	*Yield of fire-wood.*	*Revenue realized.*	*Nature of work done.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
							RS.	
1949–50 ..	No planting.	..	..	..	..	..	..	Clearfelled and planted.
1950–51 ..	Kille Reserved Forest.	New area ..	50·0	1950–51	47·5	..	..	..
1951–52 to 1953–54.	No planting.							
1954–55 ..	Kille ..	Old plantation of five acres and 1945–46 plantation of 48 acres.	53·0	1953–54	54·0	251½	6,600	Only clear-felling was done in 1953–54 but not planted up.
1955–56 ..	Do. ..	1946–47 plantation.	56·0	1954–55	50·0	318½	4,500	Only clear-felling was done in 1954–55 but not planted up.
1956–57 ..	Pichavaram.	1947–48 plantation.	35·0	1954–55	33·0	90½	385	Only clear-felling was done in 1954–55 but not planted up.

In addition, casuarina plantations were raised in Ariyakoshti unreserve land over 82 acres in 1955 and in Porto Novo unreserve land, over 45 acres in 1956.

131. In the meanwhile, the then Chief Conservator of Forests (Sri V. V. Subramanian, I.C.S.) ordered the clearfelling of all the casuarina plantations and replanting them with the miscellaneous species, except in coastal areas in Chief Conservator of Forest's Proceedings No. 34240 of 1953, dated 24th November 1953, as he considered that the large-scale thefts in these plantations were mainly due to their location in vulnerable areas. The details of the Plantations thus clearfelled in addition to those indicated in last paragraph are given in Appendix VII.

132. No casuarina plantations were raised in the clearfelled areas. It is considered that the position could have been improved by reinforcing the existing protection staff and tightening up protection on all sides, instead of giving up the scheme altogether and cashing what was on hand. This is amply proved and justified by the existence of the 1950 casuarina plantation during the past three years.

133. *Felling and extraction.*—Coupes were prescribed for sale annually. After clear-felling, uprooted of the existing growth and levelling up the land were also prescribed.

134. *Sale of clearfelling coupes.*—In the past each year's regeneration area has been treated as unit of sale. In view of the high price obtaining for casuarina, it is considered that if the areas are sold in smaller units say 25 acres, better prices will be realized due to more keen competition. ...

135. *Silvicultural system.*—The silvicultural system prescribed was clearfelling and planting with casuarina.

136. *Rotation.*—A tentative rotation of eight years was fixed in the absence of any data. ...

137. *Espacement.*—The 6 feet by 6 feet espacement prescribed in the Working Plan was not adopted and the 1950 plantation was raised at 7 feet by 7 feet espacement. The reasons for this deviation is not available in the files. From 1955 onwards, the espacement was raised to 8½ feet by 8½ feet and both the 1955 and 1956 plantations were raised at 8½ feet by 8½ feet. The 6 feet by 6 feet espacement was considered close for the healthy development and also increased the cost of formation because of watering more plants. This change was ordered in Chief Conservator's Reference No. 133 of 1954, dated 28th September 1954. ...

138. *Preparation of the planting site.*—The sale and felling and removal of the growth earlier than April was prescribed. The material left over was evenly spread over the area and burnt ploughing with buldozer or country plough was done to get uniform planting area. Contour bunds 2 feet width and 1½ feet high at intervals of two or three chains were constructed to prevent surface run-off.

139. *Nursery.*—The nursery beds were formed in December. The nursery site was fenced and a well dug to water the plants. Sheep were penned for two or three nights and standard nursery beds were formed after ploughing the soil. Seeds one pound per bed were sown covered with a sprinkling of sand or ash and a layer of casuarina twigs. The beds were watered both in the morning and evening with a water-can fitted with a fine rose. In about seven months the plants were ready for planting. No tending was prescribed. Only in congested patches, pricking out the seedlings was prescribed. It was considered that about four to eight ounces of seeds per standard nursery bed was sufficient to stock the beds and that one pound was quite a large quantity.

140. *Planting operations.*—Pits of one-foot cube were dug in July–August after the rains have fallen. Between September–November as soon as the North-East monsoon set in, healthy seedlings with shoot not less than 18 inches and root not less than 12 inches will be taken out of the nursery beds and planted in the pits without bending the roots. Fine particles of sand attached to the roots were not shaken off and soil was well pressed around the roots in the pits. The planting of seedlings along with North-East monsoon late in the growing season was found to result in large casualties as it did not result in established seedlings which could stand the heat of the summer months. Planting during the South-West monsoon rains in June–July gave better results and large number of established seedlings to survive through the hot summer.

141. *Brick planting.*—Equal quantities of cow-dung manure, red earth, sandy soil in equal portion were mixed well and made into bricks of size 14 inches by 8 inches by 6 inches With wooden moulds. The casuarina seedlings were pricked in each brick and watered. These transplanted seedlings were planted with the bricks at the proper time along with the other seedlings in the regeneration area. In 1956 regeneration area in one acre these seedlings were planted. These seedlings showed better development than the rest. The further developments will have to be watched. The making, handling and transport of the bricks were cumbersome, and if this is to be adopted on a large-scale, the details of making proper-sized bricks will have to be worked out. Besides the methods of reducing the cost of the bricks will also have to be worked out.

142. *Watering.*—Watering was prescribed as below :—

(i) First ten days after planting at the rate of half a pot (equal to one gallon) both morning and evening till the rains set in.

(ii) For the next ten days watering on every alternate evening.

(iii) For the rest of the period, twice a week or more often if required according to the incidence of North-East monsoon. As a rule, watering was prescribed to be done whenever the soil was found to be dry after digging the soil for 6 inches and if the plants are withering.

143. The prescriptions with regard to watering were generally followed. With the change in the planting time, the watering regime also underwent changes. It was seen that by quickly establishing the seedling in the regeneration area, not only the casualties in the first hot season became less, but watering required was also considerably reduced. In a few cases, no watering was required after the onset of North-East monsoon in October. Watering has to be done judiciously and it is here that the skill of the subordinates come into play. It was found in practice that the following regime of watering is the most suitable one :—

(i) Watering the plants for the first 15 days at one-third pot of water per plant both morning and evening.

(ii) Watering the plants with one-third pot of water on alternate days alone during August and September, on non-rainy days (number of watering days is recorded as 24).

(iii) Watering the plants with one-third pot of water twice a week from October to the following March on non-rainy days (number of watering days is recorded as 40).

144. In the estimates for raising the casuarina plantations, rate adopted for watering 650 plants is one female mazdoor. In practice, this figure of 650 plants is never achieved. Even where the water table is quite high, as in Porto Novo unreserve land not more than 550 plants can be watered at the most in a day. Necessary changes will be required in the estimates in this regard. For watering the plants, the female mazdoors bring their own mud pots, which are of varying capacity. In order to get the maximum outturn

from the mazdoors, it is essential that standard pots of 3-gallon capacity are supplied to them. This can be best achieved by the Department arranging for the supply of these pots.

145. *Replacement of casualties.*—Casualty replacement was prescribed to be done as and when they are noticed in the first year. For this purpose, the best and vigorous seedlings from the left-over stock in the nursery beds was used. It is seen that replacements of casualties have been done up to the end of December. Such an operation cannot afford the seedling adequate opportunity to establish itself and survive the hot season. It is considered that all replacements should be done as soon as the North-East monsoon begins and should not be done after October in any case.

146. It was prescribed that as soon as the tips of seedlings are seen withering, a second seedling should be planted by the side of the second plant. The time of removal of the seedling with the broken leading shoot was during pruning. To allow two seedlings to remain in the same pit for about four years cannot be very conducive to the growth of the other seedlings. Such a practice will result in more casualties only. It is essential that the plant with the top leader broken should be removed at least before the beginning of the hot season, in order to afford a fair chance for the other seedlings to come up.

147. *Tendings.*—Two weedingswere prescribed for a radius of 18 inches round the plant in October and December. At the end of North-East monsoon in January a thorough soil working round the plants for a radius of 18 inches and depth of 6 inches was prescribed. These operations were generally carried out.

148. *Pruning.*—The prescriptions regarding pruning were not precise. Prunings were prescribed in the fourth or fifth year according to the growth of the plants. All plantations below 3 feet were not to be pruned. Plants of height between 3 feet and 6 feet were pruned to a height of 3 feet. For plants above 6 feet pruning was prescribed to a height of 6 feet. Removal of branches by a sharp knife at a distance one inch from the stem, removal of dead trees at the time of pruning were prescribed. If more than one plant existed in each pit, the retention of the best of them and removal of the rest was prescribed. The operations were to be carried out in November departmentally and the produce sold in auction. The pruning in the plantations were carried out in the fifth year. In short rotation crops like casuarina, one pruning at the fourth year is considered ample.

149. *Thinnings.*—No thinnings were carried out in any of the plantations even though the discretion was given to the District Forest Officer for doing them if found necessary. It is considered that thinnings may not be necessary at all in a short rotation crop like casuarina.

150. *Fencing.*—As iron continued to be a controlled commodity, there was difficulty in getting adequate fencing material. A few hundred rolls of Sammerfield track wire fencing purchased from the Nowal Stores were used for a few plantations. Sowing of thorny species along the mounds though done in 1950 it did not succeed and grow into a good live-fence. Further, experience in Tiruchirappalli division showed that it is undesirable to introduce this species as a fence, as it had colonised the casuarina plantations and was found difficult to eradicate. Every effort will be made to get iron fencing material and use it for the plantations.

151. *Wells.*—These were prescribed to be dug at the rate of one per three acres of regeneration area. These prescriptions were carried out.

152. *Rain-gauges.*—These were not maintained in the plantations. The desirability to maintain them is not only to have valuable rainfall data but also to have an effective control over the watering operations done in the casuarina plantations.

153. *Fuel working circle-constitution.*—Three fuel series were formed as detailed below :—

Name of Reserved Forest.	Area in acres.
Athipakam North	1,210
Athipakam South	1,850
Pichavaram	1,150

For want of data, the rotation was tentatively fixed as 40 years and coupes were allotted in each series for the whole rotation.

154. *Method of treatment.*—The silvicultural system prescribed was simple coppice with the reservation of certain trees as standards. The fellings were regulated by area. The coupes after demarcation were to be sold in open auction at the rate of one coupe every year in each series. Definite coupes were not allotted for particular years. The arrear coupes were to be sold in the following years. The lease period was fixed as the financial year. The usual felling rates regarding coppicing, leaving the standards, felling

by strips and others were prescribed. The felled material was to be billeted and arranged into stacks of 5 feet by 4 feet by 2½ feet = 50 cubic feet. Trees yielding timber will be hammermarked by the beat Forest Guard before their removal from the coupes. No artificial regeneration operations in the felled coupes were prescribed. The felled coupes were prescribed for closure to grazing for four years including the year of felling.

155. *Area worked.*—The details of the areas prescribed and those actually worked in each Fuel Series are furnished in Appendix IX. There was regular demand for the coupes in Pichavaram Series only. While in the case of Attipakkam South Series there was demand for the first three years only, in the case of Attipakkam North Series, there was demand for only one year. The lack of demand was mainly due to the poor growth in the coupes. As a result the District Forest Officer in consultation with the Collector and the Conservator of Forests, Salem Circle, closed the Attipakkam South and North Series. It is quite essential to give rest to the forests included in the Attipakkam South and North Series.

156. *Method of treatment.*—The method of working the Pichavaram Fuel Series has been described as simple coppice with reservation of certain standards. In the mangrove forests, as most of the species are evergreen, the trees rarely coppice and regeneration is depended on by natural seedlings. The correct term for the system adopted is the ' Uniform System '.

157. *Demarcation of coupes.*—Cutting of 15 feet wide coupe lines and 10 feet wide strip lines have been prescribed in the Working Plan. It is considered that they are quite unnecessary and that 12 feet wide coupe lines and 6 feet strip lines will be adequate.

158. *Lease period for fuel coupes.*—The lease period has been prescribed as one year for each coupe. According to the orders of the Chief Conservator of Forests, at present the lease period for the fuel coupes is fixed according to their area. This has been done so in order to avoid the presence of the contractor within the Reserved Forest for a period longer than necessary. This will be continued.

159. *Manure leaf working circle—Constitution.*—One fuel series by name Attipakkam Fuel Series was constituted. The total area of the Fuel Series, viz., 1,070 acres was divided into three coupes as below :—

Name of coups.	*Name of reserved forest.*	*Area in acres.*
(1)	(2)	(3)
I	Attipakkam	400
II	Do.	310
III	Do.	360
	Total ..	1,070

160. *Method of treatment.*—Lopping of trees and shrubs of manurial value except certain specified species on a felling cycle of 3 years were demarcated annually by 6 feet wide lines. The removal of the manure leaves were permitted on payment of seigniorage fees at 12 annas per cart-load and six pies per head-load. Lopping of branches thicker than a man's finger was prohibited. All shrubs will be cut flush with the ground level without tearing the bark. Removals during the night were also prohibited.

161. For artificial regeneration of manure leaf species detailed instructions for regeneration works were to be carried out only if an experiment started in Kattur Reserved Forest of Chingleput district in 1948–49 over five acres succeeded. Since this experiment was not successful, no artificial regeneration operations were done.

162. *Working of coupes.*—In actual practice, difficulty was experienced in confining the removal of the manure leaves only to the coupes prescribed for the year. The ryots wanted the manure leaves from the reserved forests and portions of the reserved forests close to their fields and villages only and were not inelined to walk to the particular areas for removal. The details of revenue collected and quantities removed are furnished below :—

Year.	*Quantities removed*		*Value.*		
	Cart-loads.	*Head-loads.*			
(1)	(2)	(3)	(4)		
			RS.	AS.	PS.
1949–50	177	30	209	12	0
1950–51	19	..	23	12	0
1951–52	Nil	..		..	
1952–53	..	..		..	
1954–55	87	..	65	4	0
1955–56	Nil	..		—	

163. *Manure leaf removal.*—The removal of green manure leaves from the reserved forests by the ryots for wet cultivation assumed importance during the war and post-war years due to the Grow More Food Schemes. The various Government Orders passed controlling their removal from the reserved forests are described below.

164. The Government in G.O. Ms. No. 2220, Development, dated 17th October 1942 reduced the existing rate for removal of green manure leaf in cart-loads, viz., Rs. 1–8–0 per cart-load to Re. 0-12-0 throughout the State. In G.O. Ms. No. 3028, Development, dated 27th July 1950, the Government ordered the free removal of green manure leaves from the special manure leaf coupes demarcated for the purpose in all the forest divisions. In G.Os. Ms. No. 3028, Development, dated 3rd August 1950 and Ms. No. 1090, Development, dated 13th March 1951, the Government ordered the demarcation of all fuel coupes in the State due for felling each year one year in advance of felling and allowing removal of green manure leaves by ryots subject to the following conditions :—

(i) Leafy twigs below 1 inch diameter at the base only should be cut,

(ii) period of collections should be from April to January of the next year,

(iii) permits should be issued by the Forest Range Officers only to bona fide cultivators on production of a certificate from the respective village headman, and

(iv) collection and removal should be effected only between 8 a.m. and 5 p.m. and permit must be produced for check by Forest Officers.

165. The Government in G.O. Ms. No. 1524, Agriculture, dated 6th May 1954, ordered that free removal or reduced rates of green manure leaf should be regulated by the issue of permits. The above regulations and concessions were also extended to the Estate forests taken over by Government in G.O. Ms. No. 3007, Agriculture, dated 30th December 1955. Thus the removal of manure leaves from the forests under the control of the department is controlled by the issue of permits and is done under the following three categories :—

(i) Free removal from special green manure leaf coupes,

(ii) concessional removal from other areas, and

(iii) free removal from the fuel coupes of the year to follow.

166. From the time of grant of the above concessions, they were continued year after year. In the latest G.O. Ms. No. 368, Food and Agriculture, dated 6th February 1957 these concessions were continued till the end of 1957.

167. *Minor forest produce working circle.*—The produce available in each range was constituted as a lease unit. The lease period was from January to June. It was prescribed that the lease will be sold annually in open auction to the contractors. As very little produce was available for sale there was no sale for the coupes.

168. Though no separate lease was prescribed for Tangedu bark (*Cassia auriculata*) it was sold as a separate unit in Tirukoyilur Range. The revenue realized was only small.

169. *Grazing working circle.*—All the areas except those notified for closure by the District Forest Officer from time to time for silviculture or other reasons, were included in this Working Circle. Different grazing rates for each cow unit were fixed for different reserved forests as below :—

	RS.	A.	P.
Kille Reserved Forest and Pichavaram Reserved Forest	0	10	0
Attipakkam Reserved Forest	0	8	0

As these rates were in vogue from the time of panchayat regime, they were continued.

170. The Government in G.O. Ms. No. 3442, Development, dated 25th July 1953, fixed uniform grazing fees for all the reserved forests in the State as below :—

	RS.	A.	P.
Buffaloes .. .. — — —	0	8	0
Cows — .. .. — —	0	4	0
Sheep .. .. .. — ..	0	2	0

171. *Monsoon closure.*—During the Panchayat regime the forests were closed to grazing in July and August every year and this prescribed for continuance.

172. The Government in G.O. Ms. No. 3442, Development, dated 25th July 1953, cancelled this monsoon closure, treating these panchayat forests also on a par with the reserved forests.

173. *Improvement to grazing.*—It was prescribed that rotational grazing or other improved system of grazing might be introduced after the first five years by the District

Forest Officer in consultation with the Conservator of Forests. As complete licentiousness existed at the time of Panchayat Regime for grazing, it was considered that a preparatory period of five years was necessary. As these forests were in poor condition without much growth of grass, the introduction if any improved method of grazing did not arise and it was not introduced.

174. *Protection Working Circle.*—All the areas which were not covered by way of the previous working circles were included in this working circle for mere protection and no operations were prescribed.

175. *Miscellaneous regulations.*—No special fire protection operations were considered necessary, as these forests contained semi-evergreen shrub growth. Actually few fires occur in this division. The details of the incidence of the fires have been furnished in paragraph 66.

176. *Buildings.*—As this is a newly constituted division only the Range Office building belongs to the department. It was maintained in good state of repair. The construction of Range Officer's quarters at Tirukoyilur was suggested for 1960–61.

177. *Roads.*—There are no roads belonging to the department.

178. *Unreserve lands*—(i) *Malattar river bed.*—Introduction of *Prosopis juliflora* by transplanting 18 inches high pot plants at 12 feet by 12 feet over 1 acre annually in Edayar, Gramam and Iruvelipattu unreserve lands was prescribed for five years commencing from 1949–50. It found successful, larger areas up to 50 acres each year in each of the Edayar, Tiruvennainalllur, Gramam Iruvelipattu and Tiruthoraiyur unreserve lands was prescribed to be taken in concurrence with the Territorial Conservator of Forests.

179. The experimental planting of one acre was carried out in the three unreserve lands as prescribed from 1949–50 onwards. *Prosopis juliflora* failed in all the three unreserve lands and did not come up well. In addition the following experiments were carried out in Gramam unreserve land :—

(i) In 1955 pot plants of *Prosopis juliflora, Bassia latifolia, Acacia arabica, Pongamia glabra*, Cashew and Inga dulce were planted in one-foot cube pits at 12 feet by 12 feet and the area fenced. The casualties were replaced in 1956.

(ii) In 1956 seeds of neem, *Prosopia juliflora* and cashew were sown over 10 acres and the area fenced.

(iii) In 1956 teak stumps from Wynaad Division were planted at 8½ feet by 8½ feet over 4·4 acres.

180. It is doubtful if the above three plantations will survive the hot summer of 1957. The soil contains only coarse sand without any clay fraction. Such coarse sand has been found to occur up to nearly 10 feet at places and it is very doubtful any plantation can be successfully raised in such areas.

181. The casuarina plantations already raised in these areas were clearfelled in 1954–55, along with other casuarina plantation according to the order of the Chief Conservator of Forests issued in Chief Conservator's Proceedings No. 34320 of 1953, dated 24th November 1953. The details of yield and revenue realized are given in Appendix VII.

182. *Porto Novo and Ariyakoshti Unreserve Lands.*—Planting of pot plants of *Prosopis Pithacolobeum dulce and Dalbergia multiflora* at 12 feet by 12 feet in one acre in 1949–50 in the Porto Novo unreserve lands and if found successful, extension over areas up to 50 acres with the convenience of the Territorial Conservator of Forests were prescribed.

183. As the 1949–50 planting succeeded, about 30 acres were planted with *Prosopis judiflora* in 1950.

184. *Old Casuarina Plantations.*—The 1946 casiarina plantation in Attipakkam Reserved Forest was clearfelled in 1954–55 and no regeneration operations were carried out as prescribed in the working plan. The revenue realized was Rs. 43 and the yield obtained, one ton of firewood and one cart-load of twigs.

185. *Cocoanut tope in Kille Reserved Forest.*—It was prescribed that the tope be ploughed once in two years till the plants begin to yield. Annual sale of the usufruct of the tope with the lease period spread over the fasli year was also prescribed.

186. The tope was ploughed as prescribed and manned with fresh manure in 1953–54. In 1949–50 and 1952–53, ploughing and digging round the trees and heaping the soil to a height of 2 feet around the trees only were done. During the other years, no other cultural or manuring operations were done.

187. As the trees were young and did not yield any nuts, no sale was conducted.

188. *Boundaries of the reserves.*—Certain irregularities in the boundary lines as encroachments, cleaning of the lines and correct numbering of the cairns were prescribed for rectification. These defects were not rectified.

189. *Reservation of unreserves.*—It was prescribed that steps should be taken to reserve the unreserve lands in the Malattar river bed and the Ariyakoshti and Porto Novo unreserve lands. Certain modifications to the existing area were also prescribed in order to make these areas compact blocks. No steps were taken towards these.

2. *Panchayat forest in South Arcot district now under management of Panchayat when they are resumed for management by the Forest Department.*

190. *General.*—Prescriptions for the management of these forests were made presuming the transfer of these Reserved Forests to the Department would take place shortly.

The names of these Reserved Forests are: Adukam, Natham Bit I, Natham Bit II, Tachampattu, Swamimalai, Seedevi, Kallamedu, Kunjaram, Edaikal, Pandur, Kutudi, Simpakam, Nayanur, Nangur, Semakotai and extension, Aruneri, Parur and extension, Karmangudi, Kuppanatham, Narimanur, Kattumailur and extension, Velangulam, Alwarmalai, Kangimpped Bit I and Kangimpped Bit II. The dates of taking over of these forests is given in paragraph 34. The following working circles were constituted :—

(i) Fuel Working Circle.
(ii) Manure Leaf Working Circle.
(iii) Grazing Working Circle.
(iv) Minor Forest Produce Working Circle.
(v) Areas covered by cashew tope, teak plantations sandalwood plantations, *Bassia latifolia* plantations and Nagsi tope.
(vi) Protection Working Circle.
(vii) Areas selected for fuel plantations.
(viii) Areas selected for artificial regeneration of manure leaf species.
(ix) Areas for Kasturba Memorial Leprosy Sanatorium.
(x) Areas cultivated under Grow More Food Scheme.

191. The details for each of the working circles are discussed on the following paragraph.

192. *Fuel Working Circle.*—Twelve Fuel series extending over 21,078 acres were constituted for working under 40 years rotation. The names of the series are: Swamimalai, Natham Bit I, Kunjaram, Edaikal, Kutudi, Manakollai (Senkotai Reserved Forest) Kotteri (Senkotai Reserved Forest), Karmangudi, Kattumailur, Velangulam, Alwarmalai and Adukkam. The prescriptions given under the Fuel Working Circle in paragraphs 194 and 195 were made applicable to this working circle also.

193. The results of the sale of the coupes of these 12 felling series are furnished in Appendices VI and XI. **As most of these coupes contained little growth they were not saleable. Even if saleable the revenue realized was meagre.** From the point of view of silviculture such a prescription was not very sound. What these forests required was complete rest and rehabilitation. They were badly cut, racked and grazed in the panchayat regime.

194. Artificial regeneration operations were prescribed in these felled coupes in about 10 per cent of the area not exceeding 5 acres in Swamimalai, Natham Bit I and the Muttakadu series. These regeneration operations were prescribed for the five years and if successfil, were to be extended to all the fuel series, in concurrence with the Conservator of Forests. Strips of two chains width along the length of the coupe and along the contours were to be selected, the felled slash left by the contractor heaped in the area and burnt in April-May. If more than one strip was to be selected, the strips were to be separated by 5 chains. After the burning the areas are ploughed and aligned at 12 feet by 12 feet. For plants of *Prosopis juliflora, Pithacollobium dulce and Albizzia lebbek* with not less than 9 inches of root and 9 inches shoot were to be transplanted as indicated below :—

Rows 1 to 4, 6, 8 and 10—*Prosopis juliflora.*
Rows 2, 7 and 11—*Pithacolobium dulce.*
Row 9—*Albizzia lebbek.*

195. A soil working in December-January in the first year and if necessary soil working and weeding in the second year were prescribed. If considered necessary thinnings were also prescribed to be carried out after the fifth year. If there was demand for kumri cultivation about 25 acres were prescribed annually in the following reserved forests: Swamimalai, Natham Bit I and Natham Bit II, Seedevi, Kallamedu, Edaikal, Kutadi, Siruppakkam, Pandur, Nangur, Semakotai, Alwarmalai, Kangimpped I and Kangimpped II.

196. Some efforts were made to raise plantations in Swamimalai Reserved Forest according to the above prescriptions. As the results were not successful, no further work was taken up.

197. *Manure Leaf Working Circle.*—Thirteen manure leaf series were formed covering 9,285 acres in Natham Bit I, Swamimalai, Natham Bit II, Seedevi, Edaikal, Kutadi, Sirupakkam, Nayanur, Semakotai, Kattumailur, Alwarmalai and Kangimpped, each series were divided into three coupes. A felling cycle three years was prescribed and manure leaf removal was controlled by the issue of permits. Artificial regeneration with manure leaf species was also prescribed in 1,175 acres in the various series.

198. The observations made in paragraph No. 161 hold good here also.

199. *Minor Forest Produce Working Circle.*—The various items of minor forest produce available in each reserved forest was listed out and annual sales for each reserved forest were prescribed.

200. The details of the quantity of various items of produce removed are given in Appendix VIII.

201. *Protection Workiig Circle.*—The rest of the portions of the reserved forests not included in any of the working circle extending over 23,868 acres was included in this working circle for mere protection.

202. *Grazing Working Circle.*—The entire area of the forests, viz., 58,992 acres were open to grazing under the same method of management as under the panchayats. These were generally followed. The observation made in paragraph 173 hold good here also.

203. *Miscellaneous regulations.*—(*a*) The maintenance by carrying out the necessary tending operations and the sale of the produce out of the various miscellaneous species plantations raised were prescribed in the following areas :—

(i) Mango and Tamarind tope in Seedevi Bit 'B' over 2 acres.

(ii) *Bassia latifolia* in Nangur over 2 acres.

(iii) *Bambusa arundanacia* plantation in Nangur Reserved Forest spread over 2 acres.

(iv) Cashew topes in Velangulam Reserved Forest (scattered 200 acres) Kangimpped Bit I (100 trees) and Kangimpped Bit II (450 trees).

Several of these plantations were felled and were in a bad state when the forest actually reverted to department and hence there was no necessity to carry out any silvicultural tending operations except that of mere protection.

(*b*) Working Plan for Vellore East Division.

204. *General.*—The Pavunjipattu Reserved Forest was included in the Working Plan for the Fuel and Small Timber Working Circle. In this working circle only the portions of the prescriptions as far as they are applicable to the Pavunjipattu Reserved Forest and the extent to which they were executed are discussed. Out of 4,313·86 acres, 2,487 acres were constituted into Pavunjipattu Fuel series. The balance area was merely protected as such. For want of experimental or other data, the rotation was empirically fixed at 35 years. The annual coupe area was obtained by dividing the total area under the Fuel series by the rotation and coupes were allotted for the whole rotation. The yield from the coupes was also forecast after considering the existing growing stock and the yield obtained in the past working. The prescriptions regarding the sale and demarcation of the coupes were similar to those prescribed in the Fuel Working Circle of Chingleput Working Plan.

205. In the year prior to that of working the coupes were prescribed for being sold as manure leaf coupes with the lease period for six months from 1st August to 31st January of the following year. With the introduction of free removal of green manure leaves in G.O. No. 2928, Development, dated 27th July 1950, these sales were not conducted. Due to lack of demand, the green manure leaf coupes were not sold in the previous year.

206. The details of the areas prescribed worked, the yield and the revenue obtained are given in Appendices VI and IX. Generally good prices were realised and there was no difficulty in working.

207. *Artificial regeneration operations.*—In the felled coupes, about 180 acres were selected for regeneration of miscellaneous species as *Prosopis juliflora* and *Inga dulce* by kumri method. The full details of the prescriptions are not given as no one came forward to take up kumri cultivation in these areas.

SECTION 3—SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN.

(a) *Silvicultural improvements.*

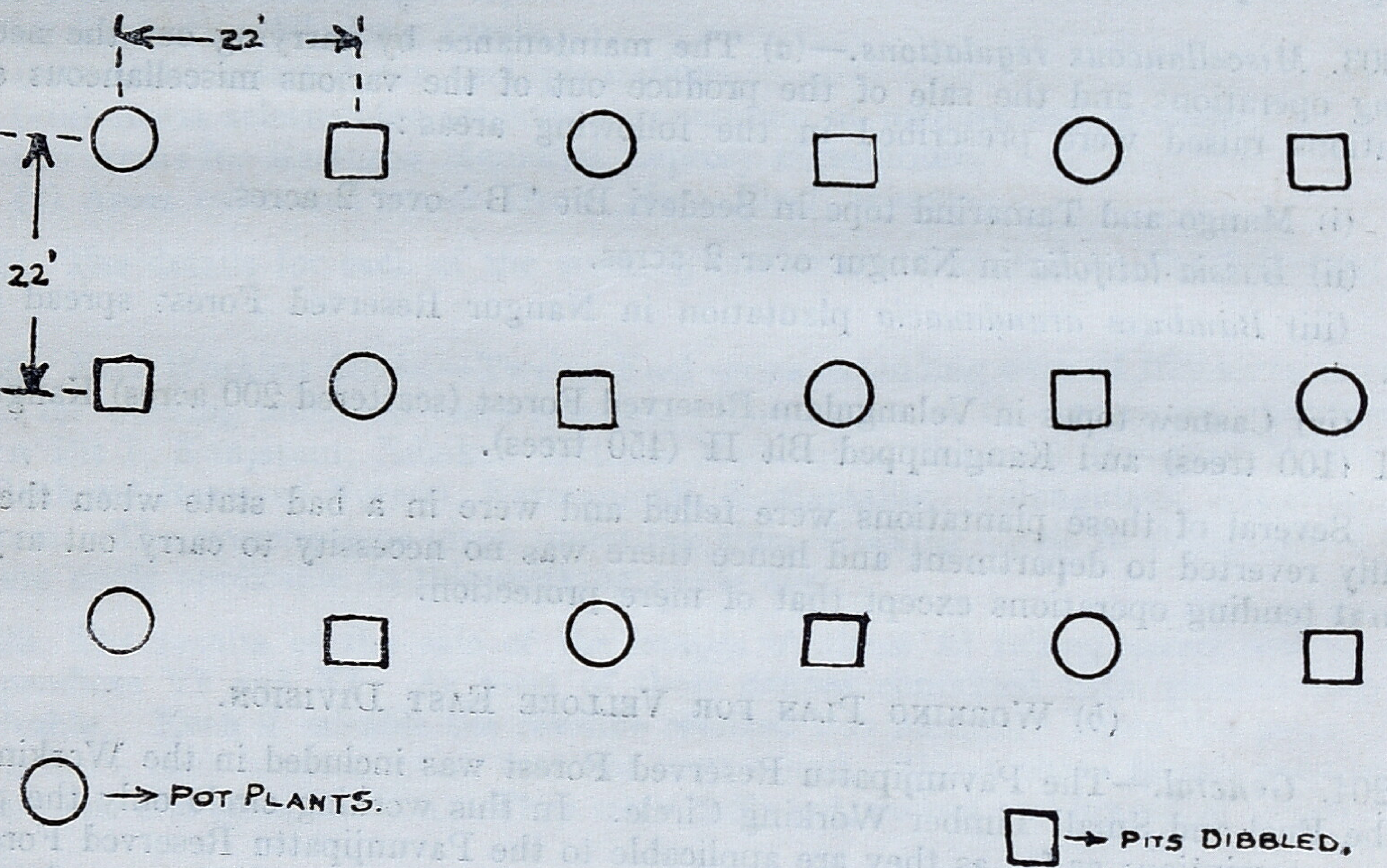
208. During the First and Second Five-Year Plans, several regeneration operations were undertaken to improve the status of the forests. These improvements were not anticipated or prescribed in the Working Plans.

209. *Afforestation of dry fuel forests.*—From 1953 onwards, large scale afforestation schemes were taken up to rehabilitate the ex-panchayat reserve forests. Since it was the first venture in this direction, the regeneration technique adopted in 1953 underwent changes almost every year. The details of the regeneration techniques followed in the plains forests are discussed below separately for each year. Since there are no hill forests in this division, no afforestation works were done in those areas.

210. (1) 1953–54.—The details of the areas regenerated are given below :—

Name of reserved forest. (1)	*Species planted.* (2)	*Area in acres.* (3)	*Cost in rupees.* (4)	*Remarks.* (5)
Nayanur	Miscellaneous fuel and small timber species.	170	2,315	..
Kuppanatham ..	Miscellaneous fuel and small timber species.	144	2,864	..

211. The regeneration method consisted in digging one foot cube pits at an espacement of 22 feet by 22 feet in the regeneration area well ahead of planting in November-December of the previous year so that there was adequate time for weathering of the soil. Planting was done in alternate pits only when the soil was fully soaked in rain water and this was particularly stressed for obtaining success. Pot plants were used as planting stock.



In the left-over pits, dibbling of seeds was done early in the rains. The species used for regeneration operations were mainly of fuel and small timber variety, viz., *Albizzia lebbek, Acacia arabica, Tamrindus indica, Neem Albizzia amara* and others. Replacement of casualties were done several times as and when they were noticed.

The regeneration areas were demarcated by cutting 6 feet wide strip lines. Elaborate methods of fencing the plot were done. A continuous trench of depth about one foot depth was dug around the regeneration plot and the dug-out earth is heaped to a raised mound of about one and half feet height. A strong thorn fence of about 6 feet height was erected on the mounds with the following species : *Balsamodendron berryi, Protium caudatum, Agave americana, Euphorbia tirucalli, Euphorbia antiquorum* and others. Seeds of *Prosopis juliflora* were also sown on the mounds. This fence was reinforced by the cut materials obtained in demarcating the area.

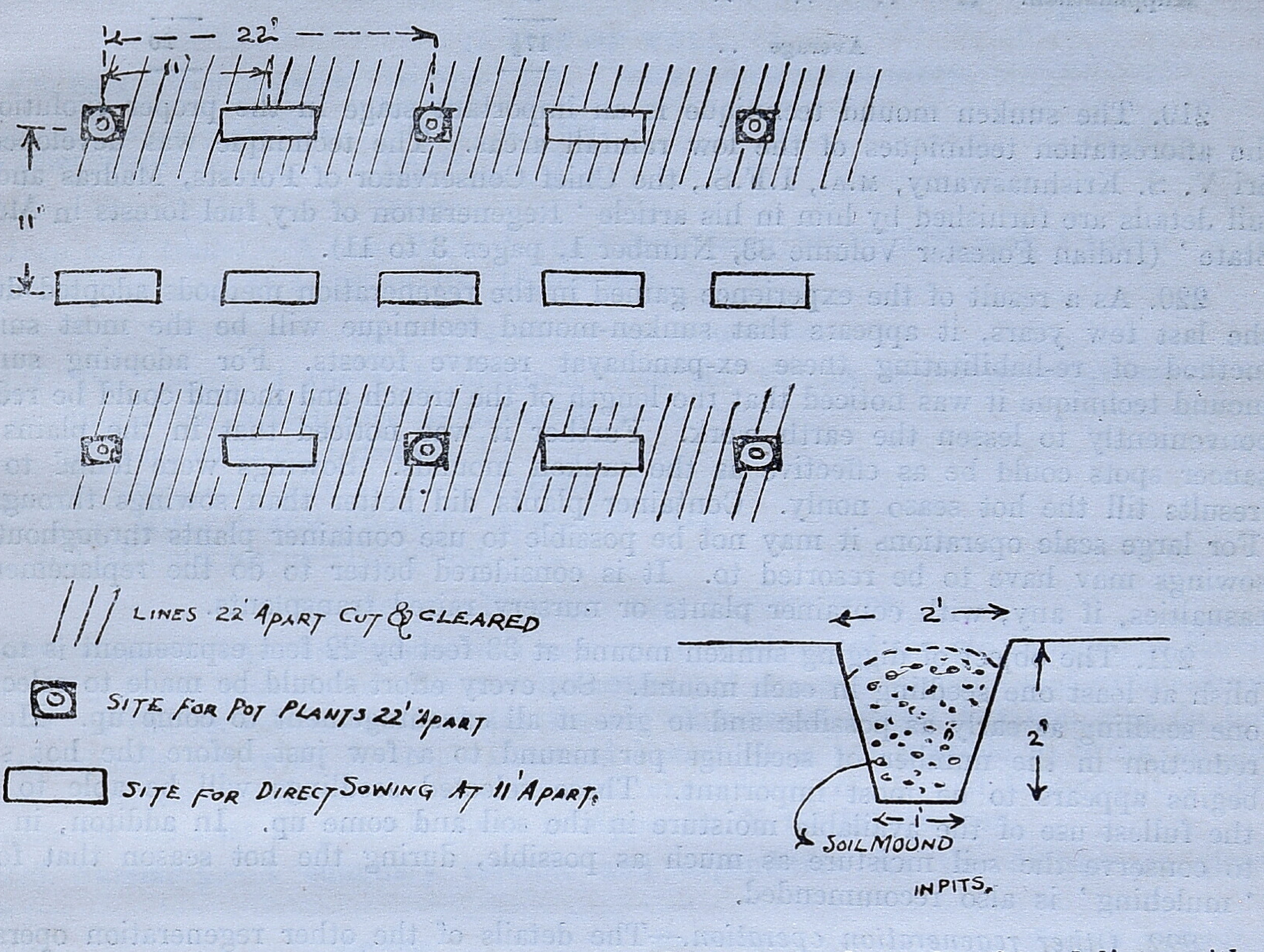
212 Since this was the first year of launching on such large scale regeneration operations there was difficulty in procuring adequate quantities of seeds and pot plants.

213. (ii) 1954–55.—The details of the areas regenerated are given below :—

Name of reserved forest. (1)	*Species planted.* (2)	*Area in acres.* (3)	*Cost in rupees.* (4)	*Remarks.* (5)
Athipakkam	Miscellaneous	293	10,750	..
Kuppanatham ..	Do.	290	10,920	..
Athipakkam	Matchwood	50	1,500 *	..

* Approximate amount.

214. The pattern of digging pits and the subsequent earth work were considerably modified during this year, though the method of regeneration generally remained the same. Two feet wide lines were cleared at 22 feet apart approximately along the contours and pits of size 2 feet by 2 feet at the top, 1 foot by 1 foot at the bottom and one foot depth were dug along the cut lines at 22 feet intervals to get an espacement of 22 feet by 22 feet. The dug up soil will be heaped on the down slope side, left to weather for about 10 days and then refilled the pit with an annular channel all round the mound for



planting the pot-plants in these pits. Patches will be made along the cleared lines with 5 feet long by 1 foot width by ½ foot depth, spaced at 11 feet apart from centre to centre, approximately along the contours and in conjunction with the pits dug. The soil removed from the patches will be heaped as a mound adjoining the patch and along its length on the down slope side. About 20 seeds of various species will be sown along that side of the mound which faces the patch.

215. Some of the defects of the method adopted this year are insufficient width of the cleared lines and the digging of patches (5 feet by 1 foot by ½ foot) in the forests without any clearing of the growth and the difficulty of properly planting the pot plants within the pit.

216. 1955-56.—The details of the areas regenerated are given below :—

Name of reserved forest.	*Species planted.*	*Area in acres.*	*Cost in rupees.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)
Alwarmalai ..	.. Miscellaneous species	100	2,766	..
Kuppanatham	.. Do.	102	2,691	..
Athipakkam ..	.. Matchwoods	50	1,500*	* Approximate value.

217. During this year, certain changes were introduced in the technique adopted and the 'suuken mound' technique came into existence. In the plains areas, trenches 11 feet by 1 foot by 1 foot were dug at intervals of 22 feet in lines 33 feet apart. The dug up earth after weathering was placed in the middle of the trench to form a slightly raised (15 inches high) flat mound, 6 feet long at the top, leaving the ends of the trench unfilled for collection of rain water. Seeds were sown in the mound. Container plants and seedlings direct from the nursery were also planted. The advantage of this technique are the worked-up soil and the water traps, to conserve moisture.

218. The results obtained at the end of the first hot season in 1956 were nothing spectacular. Numerous seedlings from the sowings and the transplants were noticed on the mounds during the North-East monsoon. The poor results were probably due to

not reducing the seedlings in each mound to a few before the hot season, when there is scarcity for moisture. It was also noticed that in general pot plants gave higher survival percentage than sowings after the first summer as shown below :—

Name of Fuel Regeneration area. (1)	Percentage of success from sowings. (2)	Percentage of success from container plants. (3)
Alwarmalai	20	20
Kuppanatham	15	20
Average ..	17½	20

219. The sunken mound technique is an important stage in the proper evolution of the afforestation techniques of the low rainfall areas. The technique was developed by Sri V. S. Krishnaswamy, M.A., I.F.S., the Chief Conservator of Forests, Madras and the full details are furnished by him in his article ' Regeneration of dry fuel forests in Madras State ' (Indian Forester Volume 83, Number 1, pages 3 to 11).

220. As a result of the experience gained in the regeneration methods adopted during the last few years, it appears that sunken-mound technique will be the most suitable method of re-habilitating these ex-panchayat reserve forests. For adopting sunken-mound technique it was noticed that the length of the trench and mound could be reduced conveniently to lessen the earth work. Further it was noticed that in the plains, the saucer spots could be as effective as the sunken mounds. Sowings were found to give results till the hot seaso nonly. Container plants did better than sowings throughout. For large scale operations it may not be possible to use container plants throughout and sowings mav have to be resorted to. It is considered better to do the replacement of casualties, if any, with container plants or nursery raised transplants.

221. The object of digging sunken mound at 33 feet by 22 feet espacement is to establish at least one seedling in each mound. So, every effort should be made to select this one seedling as early as possible and to give it all encouragement to come up. Hence a reduction in the number of seedlings per maund to a few just before the hot season begins appears to be most important. These selected seedlings will be able to make the fullest use of the available moisture in the soil and come up. In additon, in order to conserve the soil moisture as much as possible, during the hot season that follows ' mulching ' is also recommended.

222. *Other regeneration operation.*—The details of the other regeneration operations undertaken and the results obtained are given in the statement below :—

Year. (1)	Name of reserved forest. (2)	Name of work. (3)	Results. (4)
1955 ..	Porto Novo unreserve land.	Teak stumps planted at 6′ × 6′ over 0·9 acre in North-East manson.	Completely failed as the soil was sandy.
1955 ..	Gramam unreserve land ..	*Prosopis juliflora Bassia latifolia Pougamai glabra* Cashew and Kodukapuli ' pot plants ' were planted in one foot cube pits at 12′ × 12′ in 10 acres and fenced. Casualties were replaced in 1955 and 1956.	Do.
1956 ..	Do. ..	Neem and *Prosopis juliflora.* Seeds were sown in 10 acres. Again 500 cashew seeds were sown in North-East monsoon.	Soil sandy and so success doubtful. Results to be assessed after the first hot season.
1956 ..	Do. ..	Teak stumps planted at 8½′ × 8½′ over 4·4 acres.	Do.
1956 ..	Porto Novo unreserve land.	Teak stumps were planted at 6′ × 6′ over 1 acre.	Do.

The general trend of the results obtained was not very encoiraging to embark on any large-scale operations in the areas tried.

Other improvements buildings, wells and roads.

223. No new construction of buildings or wells or formation of roads was undertaken as the divsion was considered to be a temporary one. The details of the buildings and wells belonging to the Department and within the jurisdiction of this division are given below :—

I. LIST OF BUILDINGS.

	Name. (1)	Date of acquisition. (2)	Cost in Rs. (3)	Details of structure. (4)	Remarks. (5)
1	Tirukoyilur Range Office ..	1910	2112	Walls brick in lime mortar. Flooring tiles cement plastered tiled roof.	..
2	Rest house at Pavunjipattu (1 room with 2 bath-rooms)	1916	1536	Walls brick in lime mortar. Flooring paved with square brick tiled roof.	..
3	Kitchen and godown (2 rooms).	1924	464	Do.	

I. LIST OF BUILDING—cont.

Name.	*Date of acquisition.*	*Cost in rupees,*	*Details of structure.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)
(c) Subordinates quarters 3 rooms with 3 kitchens.	1909	624/-	Wall brick in line motor.—flooring Paved with square brick tiled roof.	One is used as Forest Guard's quarters, one as Watchers quarters and another as inspection shed.

II. LIST OF WELL.

1 Well in Range Officer compound	1st October 1947.	198	Walls of brick in lime mortar.	..
2 Well in Pavunji puttu Rest-house compound.	1910 by Vel ore East Division.	Rs. 400 well Rs. 5 land	Do.	..

Jeep with trailer.—A new Willy 4-wheel drive jeep (MSP 7432) with a trailer (MSP 7436) was purchased at a cost of Rs. 13,268–9–6.

SECTION 4—PAST YIELD GENERAL.

224. The details of the yield obtained from the various exploitation operations in each working circle is furnished as indicated below :—

(i) Fuel coupes—Appendix VI.
(ii) Casuarina plantations—Appendix VII.
(iii) Minor Forest Produce—Appendix VIII.
(iv) Manure leaves—Paragraph 162.

SECTION 5—REVENUE AND EXPENDITURE.

225. *General.*—As this division is a new one formed out of the old Chingleput Forest Division, it is not possible to give any indications of the past revenue and expenditure. Further, as the records maintained for the old Chingleput Forest Division also do not give the details separately for each Reserved Forest, it is not possible to break up the figures. Yet, the details of the Revenue and expenditure of the old Chingleput Forest Division for the llast 10 years is given in Appendix X for information.

226. *Summary.*—A summary revenue and expenditure for the division is given below :—

Year. (1)	*Revenue.* (2)			*Expenditure.* (3)				*Surplus or deficit.* (4)		
	RS.	A.	PS.	RS.	A.	PS.		RS.	A.	PS.
1947–48	16,643	12	0	2,21,153	11	0	..	—204,509	15	0
1948–49	58,997	8	9	1,99,891	14	0	..	—1,40,894	5	3
1949–50	1,09,770	9	0	1,86,832	9	9	..	—77,062	0	9
1950–51	1,35,244	14	4	1,66,796	8	0	..	—31,551	9	8
1951–52	1,53,074	8	5	1,68,944	14	9	..	—15,870	6	4
1952–53	1,28,0 7	9	1	1,81,897	11	0	..	—53,870	1	11
1953–54	1,25.390	7	0	2,11,506	8	0	..	—86,116	1	0
1954–55	2,26,851	0	0	1,87,986	0	0	..	×38,865	0	0
1955–56	1,86,495	3	0	2,33,486	4	0	..	—46,991	1	0
Total ..	1,140,495	7	7	17,58,496	0	6	..	6,18,000	12	10
Average deficit ..	1,14.049	8	9	1,75,849	9	7		61,800	1	3

227. As the division mainly consisted of scrub jungle of ex-panchayat reserve forests, the resources for revenue were nothing except grazing. As these forests had to be developed by undertaking intense regeneration operations, the expenditure was high. These are the main reasons for the division to remain as a deficit one. This will continue for some more years till the forests are fully developed and become ripe for exploitation.

SECTION 6—MISCELLANEOUS.

228. *List of officers.*—A list of the District Forest Officers who held charge of the former Chingleput Forest Division is given below for information.

List of officers who held charge of the former Chingleput division

Serial number and name. (1)	*From* (2)	*To* (3)	*Remarks.* (4)
1 Sri M. R. Doraiswamy Iyer ..	16th July 1945 ..	31st March 1947	..
2 Sri Chathu Nayar ..	1st April 1947 ..	21st June 1947	..
3 Sri N. Thirumoorthy ..	22nd June 1947 ..	4th November 1948	..
4 Sri Vriddhachalam Pillai ..	5th November 1948 ..	14th June 1950	..
5 Sri Mohammud Hussain ..	15th June 1950 ..	26th August 1952	..
6 Sri B. A. Cariappa ..	27th August 1952 ..	4th February 1954	..
7 Sri N. Ramakrishnan ..	5th February 1954 ..	6th February 1954	..
8 Sri K. P. D. Rao ..	7th February 1954 ..	13th March 1954	..
9 Sri V. S. Krishnaswamy ..	15th March 1954 ..	2nd April 1954 ..	..
10 Sri K. P. D. Rao ..	3rd April 1954 ..	27th December 1954	..
11 Sri N. Ramakrishnan ..	28th December 1954 ..	30th January 1955	..
12 Sri K. P. D. Rao ..	31st January 1955		..

CHAPTER VI—STATISTICS OF GROWTH AND YIELD.

(1) Stockmapping of ex-panchayat reserved forests.

229. *General.*—The ex-panchayat reserved forests were stockmapped in order to assess the nature of the growing stock existing there. As the time at the disposal was short and large areas had to be covered, it was decided to do an ocular stockmapping only by inspecting at least 10 per cent of the forest area. For this purpose, base lines and strip lines at regular intervals were traversed with a pocket compass.

230. *Determination of fertility gradient.*—From the general lie of the country, it was seen that there was a general rise from the coast to the interior towards the hills. As the type of the forests varied with elevation, it was presumed that a fertility gradient existed from the coast to the top of the hills. As the general direction of the lie of the hill ranges was found to have 20° N bearing this bearing was taken for the base lines and 110° N was taken as the bearing for the strip lines.

231. *Details of field work.*—In each ex-panchayat reserved forest the base line and strip lines were drawn on a large scale map (8 inches or 4 inches to a mile) with the bearings given in the last paragraph. Along the boundary lines, the positions of the strip lines were peg-marked on the ground. The forester walked along each strip lines by maintaining the general direction with the help of the pocket compass and marked the details of the growing stock as to their species, density, the status of regeneration, the yield per acre and other important features in the sketch. At the same time, the suitability of the portions of reserved forest for the regeneration of various species according to the regeneration techniques to be followed was also marked in the sketch. He also wrote a short note about the forest growth and other details of importance. About 1,000 acres of forests were stockmapped in a day. As these forests contained thick thorny growth, difficulty was experienced in following the exact directions of the strip lines. But on the whole, the general direction was maintained in stockmapping and at least 10 per cent of the reserved forest area was covered.

232. The areas selected for rehabilitation of dry fuel forests were classified into the following types :—

Type I—Areas which contain adequate number of active tree stumps, trees, pole crop, sapling or established seedlings at 25 to 30 feet apart—

These are classified into A. Plain forests and B. Hill forests.

Type II—Areas other than those falling under Type I—

These are classified into—

A. Plains forests—

(*a*) Where kumri cultivation is possible.

(*b*) Where kumri cultivation is not possible.

(i) where tractor ploughing is possible;

(ii) where tractor ploughing is not possible.

B. Hill forests—

(*a*) where adequate depth of soil occurs.

(*b*) Areas other than those under (*a*).

233. The details of the forest types stockmapped for each reserved forest are furnished in Appendix XI.

234. *Casuarina.*—The oldest plantation existing in the division was raised in 1950 in Kille Reserved Forest. A plot 1 square chain was laid out for measuring girths and height.

235. From the measurements recorded the average girth at breast height and basal area per acre were calculated. The details are furnished below :—

Plot measurements.			*Measurements per acre.*		
Number of trees.	*Basal area in square foot.*	*Girth at breast height in inches.*	*Number of trees.*	*Basal area in square foot.*	*Height and dominant tree in feet.*
(1)	(2)	(3)	(4)	(5)	(6)
101	12·32	10·52	1,010	105·20	43

Future management discussed and prescribed.

CHAPTER I—BASIS OF PROPOSALS.

236. *Introduction.*—The measures prescribed for these degraded ex-panchayat reserved forests will, in general, be in the form of improvement of their condition. Cashew plantations will be raised in the plains forest areas containing deep, well-drained, red loamy soil. The other plains and hill forest areas containing poorer type of soils will be planted up with miscellaneous species for firewood and small timber. Suitable areas along the coast will be regenerated with casuarina. The forests containing exploitable tree growth will be worked as fuel coupes to supply firewood to the neighbouring towns. Areas unfit for concentrated artificial regeneration purposes will be given protection and will be left to mature for rehabilitation.

237. In the case of the forest areas which had been subjected to regular management under working plans from the beginning, their condition will be examined and suitable prescriptions made.

GENERAL OBJECTS OF MANAGEMENT.

238. The chief objects of management are—

(i) to protect, and rehabilitate the ex-panchayat reserved forests which are in a highly degraded condition and which require rigid protection and immediate attention and to work these forest areas, along with others in conformity with silvicultural principles on the basis of sustained annual yield, so that a maximum financial return will be assured in perpetuity to the State;

(ii) to regulate the supply of small timber firewood, grazing and other forest product to meet at least partially the needs of the local population of the villages in the vicinity of the forests, in conformity with the strict principles of forest conservancy and sound management;' and

(iii) to protect the catchment areas of water sources and to conserve the forests on the hills and denuded slopes in the interests of agriculture and supply of water to the tanks and streams.

MEASURES TO SECURE THESE OBJECTS.

239. To attain the objects of management, various measures will be prescribed, including the following :—

firstly, suitable areas will be regenerated with cashew plantations, after cutting and removal of the existing growth, in strips the older plantations will be properly tended, harvested and looked after;

secondly, the conversion of the existing degraded forests containing indifferent and poor growth into those containing better tree growth yielding small timber, firewood, and minor forest product by adopting regeneration methods suitable to the locality factors in each area; the converted areas will be properly tended, and looked after;

thirdly, the existing casuarina plantations and other areas suitable for casuarina will be constituted into a regeneration series to provide equi-productive annual areas and they will be exploited regularly;

fourthly, the areas which contain good saleable tree growth will be constituted into convenient number of fuel felling series and worked regularly by selling them to contractors;

fifthly, rigid protection of the hill forests, which contain meagre soil and which are not readily susceptible to concentrated regeneration operations, will be obtained; and

sixthly, provision will be made for the regular disposal of minor forest produce, for providing grazing facilities to the local ryots, and for protection against fire.

Working circles, their area and constitution and the method of treatment to be adopted in each.

240. In order to achieve the objects of management and to give effect in detail to the measures considered necessary above, seven working circles, will be constituted. The details of the constitution, area and treatments prescribed in respect of each of these working circles are given below :—

(*a*) *Cashew working circle.*—This working circle covers an area of 15,329 acres. It is confined to the forest areas that can support cashew plantations. The method of treatment will consist of clearfelling strips of forests and regenerating them in a concentrated manner with cashew. The cashew plantations will be tended and worked on a provisional rotation of about 30 years. Six felling series will be formed.

(*b*) *Rehabilitation working circle.*—This working circle includes an area of 55,273.2 acres of degraded forests which however contain adequate depth of soil. The main object of this working circle will be rehabilitation of these degraded forests during a conversion

period of 30 years. The methods of treatment vary according to the condition of the forests. If the area contains active tree stumps or poles, or sapling crop or established seedling of useful tree species which are not saleable the growth will be tended to grow to maturity. Blanks of extent more than 25 acres occurring in these areas will be regenerated by ' sunken-mound ' or saucer or trench and mound technique. In areas which do not contain such forests, they will be clearfelled in patches and regenerated by ' saucer ' or ' sunken mound ' method in the plains and ' by trench and mound ' method in the hills. Several species suitable to the localities will be used. The rehabilitated areas will be properly tended and looked after.

(c) *Casuarina working circle.*—The area constituted under this working circle is 262 acres. The method of treatment consists of clearfelling suitable areas and concentrated artificial regeneration with casuarina. The older plantations will be tended and pruned. A rotation of nine years will be adopted.

(d) *Firewood working circle.*—This working circle extends over an area of 3,637 acres. The method of treatment consists of clearfelling and regenerating the area by simple coppice or uniform system on a felling cycle of 35 to 40 years. Felling series will be formed to meet the demands of the local population.

(e) *Protection working circle.*—This working circle is spread over 12,439.23 acres. It consists of forest areas which are kept as reserve for future regeneration operations and so they will be merely protected.

(f) *Minor Forest Produce Working Circle.*—In this overlapping working circle are included all the forests of the division. The right to collect all the minor forest products will be disposed off annually after dividing these into convenient units of sale.

(g) *Grazing Working Circle.*—This overlapping working circle also included all the forests of the division except those notified by the District Forest Officer annually in the gazette. Grazing of the cattle will be permitted after the collection of an annual grazing fee.

241. *Period of the working plan.*—This working plan will remain in force for 10 years from 1st of April 1956 to 31st of March 1966.

CHAPTER II—WORKING PLAN FOR THE CASHEW WORKING CIRCLE.

Section I—General Constitution and Character of the Vegetation.

242. *General constitution.*—The Cashew Working Circle includes the plains forest areas of mainly ex-panchayat reserved forests and portions of reserved forest which contain deep red loamy soil, considered suitable for raising cashew. Small patches of cashew plantations already raised at various times are also included in this working circle. Some of these areas supported casuarina plantations, a few years ago.

243. *Character of vegetation.*—A full description of the forests has already been furnished in Chapter II, Part I. The areas selected for cashew plantations fall mainly under Champion's types (a) Carnatic Evergreen forest—Group 6—Tropical dry evergeen forest and (b) Southern Ctuch thron forest—Group 5-A—Southern thorn forest—Type C-1 and this modifications due to adverse biotic influence.

Section 2—Division of area and analysis of crop area and formation of planting series.

244. An area of 15,329 acres has been selected for planting up cashew. The whole area has been divided into six planting series as below :—

A. Kiliruppu Series.
B. Marungur Series.
C. Elavanasur Series.
D. Palakollai Series.
E. Mudanai Series.
F. Mattur Series.

245. *Analysis of crop.*—No analysis of crop was done as the forests contained mainly shrub growth only. The details of ocular stock-mapping done for each reserved forest are furnished in Appendix XI.

Section 3—Method of treatment.

246. *Special objects of management.*—The following are the special objects of management :—

(1) To plant up with cashew the entire area in as short a time as possible in order to increase the productive capacity of these forests to the optimum extent;

(2) to ensure the maximum net revenue obtainable on a sustained yield basis by the adoption of a suitable rotation and of such measures that would lead to the maintenance and the improvement of the site quality; and

(3) consistent with the above objects of management, to continue to grow cashew plantations that will yield the maximum quantity of cashewnuts of the best grade.

247. *Measures to attain the special objects of management.*—To attain the above special objects of management it has been decided to plant up the entire area available for cashew during the Second Five-Year Plan period. It is not merely sufficient to grow the trees, but is also necessary to improve the capacity to produce the largest quantity of the best quality nuts. This can be achieved by the proper selection of seeds for nursery stock for raising the plantations.

248. *Choice of the species.*—In addition to earning valuable foreign dollar exchange, cashew is eminently desirable from the point of view of conservation of soil in these degraded forests. It is a good soil binder, has a spreading heavy foliaged crown, and come up well on a variety of soils and in areas of poor rainfall. So cashew is the species prescribed.

249. *Silviculture of cashewnut.*—Several experiments were conducted on the growth of cashew but in the Central Cashewnut Research Station, Mangalore, and other centres, the conclusions arrived at, which may be useful to us, are summarized below :—

(i) *Viability.*—Cashew seeds stored in tin receptacles were found to give 80 per cent to 100 per cent germination till eight months after collection and the viability was lost completely at the end of 14 months. Seeds stored in gunny and paddy straw lost viability completely at the end of 11 months as against 95 per cent to 98 per cent recorded by those in air-tight container.

(ii) *Germination.*—There is no difference in germination of seeds collected during five different periods in the cropping season and sown simultaneously. Seeds not fully mature did not have any advantage over the mature ones. The seeds sown with the stalk end facing upwards in a slanting position 2 to 3 inches below gave a high precentages of germination and immunity from the pests that attack the fleshy-edible cotyledonous seeds sown deeper than 3 inches did not germinate properly. Presoaking of seeds did not increase the germination percentage appreciably.

(iii) *Floristics.*—As cashew produces flowers on the twigs and branches of the *current season only*, the factors which promote the better growth are directly responsible for higher yields. It was noticed that although there are two district growth flushes in the season, it is the earlier phase from October to January that gives rise to panicles, while the later flushes of March to May are invariably unproductive. The hermaphrodite flowers occur only during the middle of the flowering season and mainly staminate flowers, during the beginning and end of the season. This accounts for the ' drying up ' of inflorescences during certain periods of flowering, due to the shedding of staminate flowers and this is sometimes mistaken for a disease.

250. The percentage of hermaphrodite flowers varies from 1.2 to 9.7 with a mean of 4.0, while the ultimate percentage of successful set works out to 3 per cent of total hermaphrodite flowers produced. The low setting is due to absence of adequate pollination. Insect pollination may be high in a mixed than a pure crop. During the peak productions of hermaphrodite flowers, i.e., January-February, there is neither wind nor rain in normal years. If a shower or two occurs, bumper yield is obtained. Artificial spraying of inflorescences during this period has also resulted in high yields. It takes about 62 days for full ripening from the date of pollination. The duration of ripening extends from 45 to 70 days. When the apple is fully ripe, the nut is mature for harvesting. Picking of nuts is a daily feature as all nuts do not ripen at the same time. March-April are the busiest months for picking fruits.

251. As the yield of the tree depends on the production of hermaphrodite flowers, and as the incidence of the production of the hermaphrodite flowers in the panicles is an inherent feature of the species, and cannot be manipulated by cultural operations, the selection of proper high yielding mother trees is of prime importance, the distance between another stigmatic end is also an important factor in obtaining high yields. Shorter style lengths and lower ratios of style length to stamen length are responsible for high yields. This factor also is an important one in the selection of mother trees. Cloudy weather was found to have no effect on the shrivelling or drying up of inflorescence.

252. *Transplanting.*—It was found that under West Coast condition one month old cashew seedlings could be transplanted successfully during any month of the year without any pre-treatment provided the seedlings were given the necessary shade and water. Cutting the stem of the transplant to one-third or half its height at the time of transplanting gave successful results. Even one year old seedlings, treated like this, gave 80 per cent to 90 per cent success. The above results were obtained in West Coast under conditions of high rainfall.

253. *Miscellaneous.*—Cashew is very sensitive to frost and cannot be grown above 3,000 feet mean sea level.

254. An analysis of the weights of seeds shows that the kernel content in a nut (by weight) is directly proportional to the weight of the nuts and that the size of the nut is not a reliable index of the contents and therefore the weight of the nut should be the main criterion for the selection of nuts.

255. Some of the observations made by private cashewnut growers regarding the influence of rainfall on crop production are given below :—

(*a*) in years of low rainfall during the monsoon, the yield tends to be sub-normal.

(*b*) Lack of adequate rainfall results in the reduction of nut size.

(*c*) Rainfall in March during the course of development of the nut induces large nut-size.

(*d*) Prolonged periods of cloudy weather or rain during the following season spoils the crop.

(*e*) Heavy rains in September and October, before flowering, enhance the yields considerably.

Cashew is said to be not a perennial yielder. Only in every alternate year, bumper yields occur.

256. *Silvicultural system.*—The system adopted will be clear-felling in strips followed by concentrated artificial regeneration with cashew.

257. *Rotation.*—No definite data is available as to the best rotation that can be adopted under forest conditions. Information gathered from private tope owners shows that the yield begins to fall down after about 20 or 25 years. Probably a rotation of 30 years under forest conditions will be suitable. It is said that trees die naturally in about 40 years in low rainfall areas. Since actually no plantations will become ripe for felling during this working plan period, the discussion about the proper rotation for cashew is not taken up and can only be of theoretical interest here.

258. *Regulation of yield.*—Since cashew trees are regular annual yielders of cashew-nuts, they will be regularly harvested year after year through the agency of contractors.

259. *Calculation of yield.*—No exact data is available regarding the yield of cashew-nuts. In this connection, Sri V. S. Krishnaswamy, M.A., I.F.S., Chief Conservator of Forests, Madras, in his article on ' Cashewnut ', says ' *Yield* '. It is said that from an acre of a middle-aged plantation about 2,500 pounds of nuts or 600 pounds of kernels may be expected. After 10 years, medium quality plantations are found to yield 800 to 1,200 lb. of nuts per acre. An adult is found to yield 30 lb. of nuts in East Coast while the same will yield only 20 lb. in the West Coast of Kerala. Some exceptionally big trees are found to yield even 100 lb. In Orissa individual trees are reported to have yielded 40 lb. on an average. According to one authority one acre will yield about 300 lb. in the Kerala State. But again all these yields entirely depend on the growth of the individual trees and the number of such trees in one acre. " The nuts with shell yield about 2·5 per cent to 3·0 per cent of kernels with pink skin. The yield of peeled kernels is 80 per cent to 90 per cent of the kernels with skins. The yield of shell oil is $12\frac{1}{2}$ per cent.

260. Even though individual trees have been found to flower even in the first year, only from the fifth year onwards the trees will start yielding some sizable quantity of nuts. The yield of nuts will then progressively increase till they reach adult stage at about the 10th year, from which time onwards, the full yield of about 1,000 lb. of nuts per acre may be realised. The yield of nuts during the period from the fifth year to tenth year may be about 500 lb. of nuts per acre per year on the average. Assuming the above figures the yield of nuts will be—

1956–57 to 1960–61—No yield.
1961–62—1,500,000 lb. or Rs. 3,00,000.
1962–63—3,000,000 lb. or Rs. 6,00,000.
1963–64—4,500,000 lb. or Rs. 9,00,000.
1964–65—6,000,000 lb. or Rs. 12,00,000.
1965–66—7,500,000 lb. or Rs. 15,00,000.

In the above calculation, a value of 5 lb. of nuts per rupee has been assumed. According to fluctuations in the market price, the revenue will also change.

SECTION 4—FELLING AND REGENERATION.

Selection of areas for regeneration.

261. This is the first time that large scale cashew plantations are raised by the department. Based on the experience gained in regenerating small patches of cashew plantations raised by the Department, the selection of areas has been done. As more and more

large scale plantations are raised, more knowledge about the areas suitable for cashew plantations will be acquired and in the light of this knowledge, the areas selected may be reviewed and adjustments made. So, it is quite essential that District Forest Officer should thoroughly inspect the annual regeneration areas prescribed for planting and exclude such of those areas as are unfit for cashew.

262. Sri V. S. Krishnaswamy, M.A., I.F.S., Chief Conservator of Forests, Madras, in his article ' Cashewnut ' while discussing the soil requirements, states : ' *Soil requirements* '. This is a very valuable tree, all parts of which are quite useful and the trees as a whole are valuable as wind belt and for fixing shifting sands. So this tree is attempted to be grown everywhere and fortunately comes up well on a variety of soils. In Madras State it has been grown successfully from sea level up to 3,000 feet elevation in soils where most other crops will fail. It has come up in badly eroded red sandy loams, in pure sandy areas, in hard laterite soils, in deep red loam and in rich alluvial soils. However, it fails to come up in clayey or very saline soils.

263. While cashew can be grown on all kinds of soil, it appears to attain best size only in deep, well-drained red-loamy soil. Swampy areas with insufficient drainage, clayey soils and ' Kallar ' soils have been found to be unsuitable for cashew and so such areas may be avoided. Cashew has been noticed to flourish well in lateritic soil.

264. *Table of annual regeneration areas.*—In the cashew scheme for the State prepared by Sri V. S. Krishnaswamy, M.A., I.F.S., Chief Conservator of Forests, Madras, about 45,000 acres has been fixed as the target for regeneration during the Second Five-Year Plan. The extent of areas that fall within the Cuddalore Forest Division comes to be about 15,000 acres. Consistent with the special objects of management for this working circle and the convenience of management the details of annual regeneration areas are laid out as below :—

A. Kiliruppu Series.

Year of planting. (1)	*Number of coupe.* (2)	*Name of range.* (3)	*Name of reserved forest.* (4)	*Area in acres.* (5)	*Remarks.* (6)
1956 ..	I	Panruti ..	Kangippu Bit 1	502·2	
1957 ..	II	Do.	Do.	512·6	
1958 ..	III	Do.	Do.	509·4	
1959 ..	IV	Do.	Do.	500·3	
1960 ..	V	Do.	Do.	350·1	
		Ulundurpet	Kallamedu	168·4	
			Total ..	2543·0	

B. Marungur series.

Year of planting. (1)	*Number of coupe.* (2)	*Name of range.* (3)	*Name of reserved forest.* (4)	*Area in acres.* (5)	*Remarks.* (6)
1956 ..	I	Panruti ..	Kangippu Bit 2	520·5	
1957 ..	II	Do.	Do.	506·3	
1958	III	Do.	Do.	512·0	
1959 ..	IV	Do.	Do.	507·0	
1960 ..	V	Do.	Do.	522·2	
			Total ..	2568·0	

C. Elavanasur series.

Year of planting. (1)	*Number of coupe.* (2)	*Name of range.* (3)	*Name of reserved forest.* (4)	*Area in acres.* (5)	*Remarks.* (6)
1956 ..	I	Ulundurpet	Sidevi	511·4	
1957 ..	II	Do.	Kuttadi	517·3	
1958 ..	III	Do.	Do.	522·2	
1959 ..	IV	Do.	Alwarmalai	523·0	
1960 ..	V	Do.	Do.	527·0	
			Total ..	2,600·9	

D. Pallakollai series.

Year of planting. (1)	*Number of coupe.* (2)	*Name of range.* (3)	*Name of reserved forest.* (4)	*Area in acres.* (5)	*Remarks.* (6)
1956 ..	I	Vriddhachalam ..	Semakottai	514·5	
1957 ..	II	Do.	Do.	525·5	
1958 ..	III	Do.	Do.	518·4	
1959 ..	IV	Do.	Do.	525·6	
1960 ..	V	Do.	Do.	292·2	
		Ulundurpet ..	Kuttadi	214·3	
			Total ..	2,590·5	

E. Mudanai series.

Year of planting. (1)	*Number of coupe.* (2)	*Name of range.* (3)	*Name of reserved forest.* (4)	*Area in acres.* (5)	*Remarks.* (6)
1956 ..	I	Vriddhachalam ..	Ammeri	482·1	
1957 ..	II	Do.	Do.	333·2	
		Do.	Narimanam	195·5	
1958 ..	III	Do.	Do.	603·4	
1959 ..	IV	Do.	Semakottai	449·3	
1960 ..	V	Do.	Do.	504·1	
			Total ..	2,567·6	

Year of planting.	Number of coupe.	Name of range.	Name of reserved forest.	Area in acres.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)
			F. Mattur series.		
1956	I	Virddhachalam	Semakottai	556·0	
1957	II	Do. ..	Do.	471·5	
1958	III	Do. ..	Do.	416·1	
1959	IV	Do. ..	Do.	522·1	
1960	V	Do. ..	Do.	493·7	
			Total ..	2,459·4	

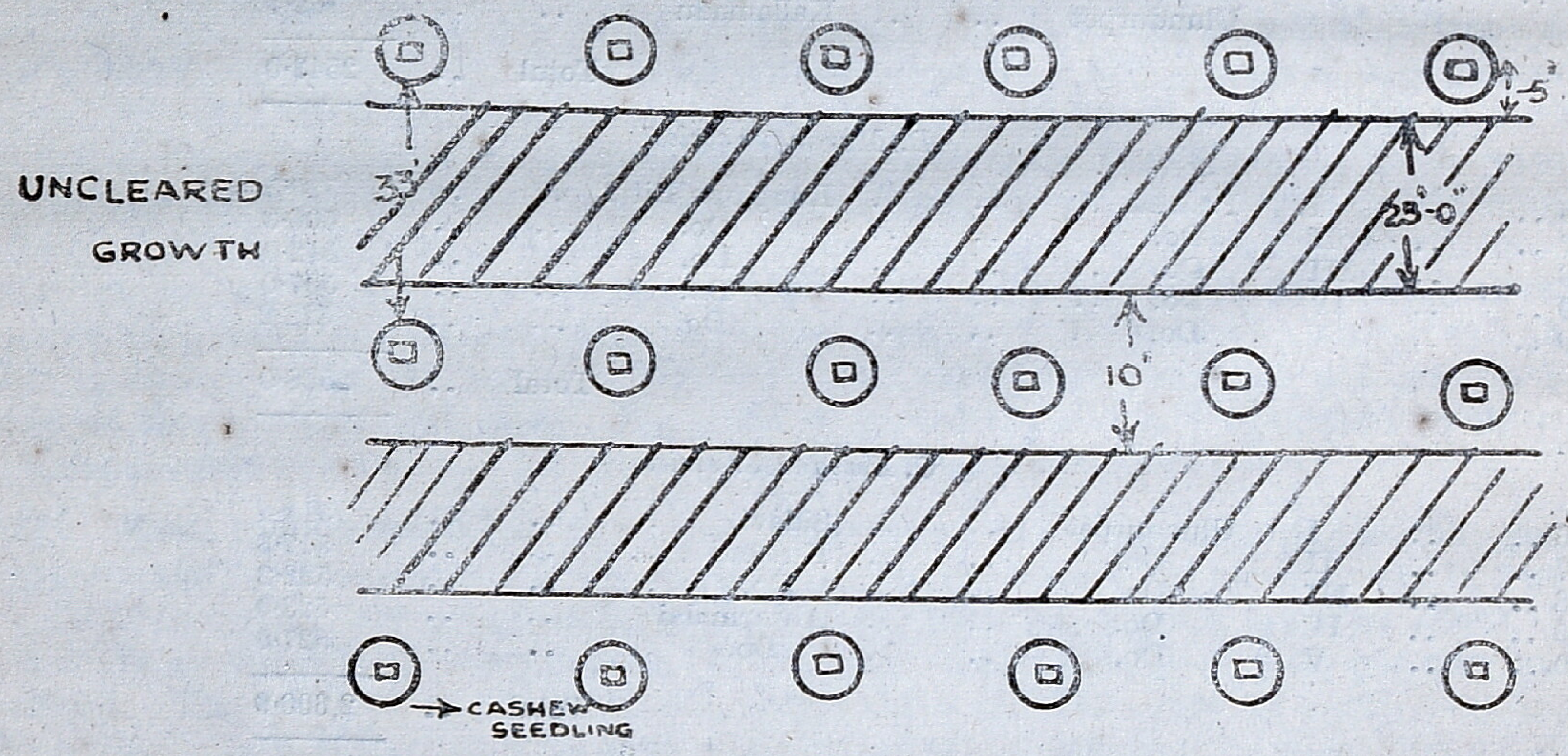
NOTE.—The areas of the coupes given above are only approximate, as they have been computed from the maps by planimeter only. The coupes have not been actually surveyed in the field and the surveyed area computed.

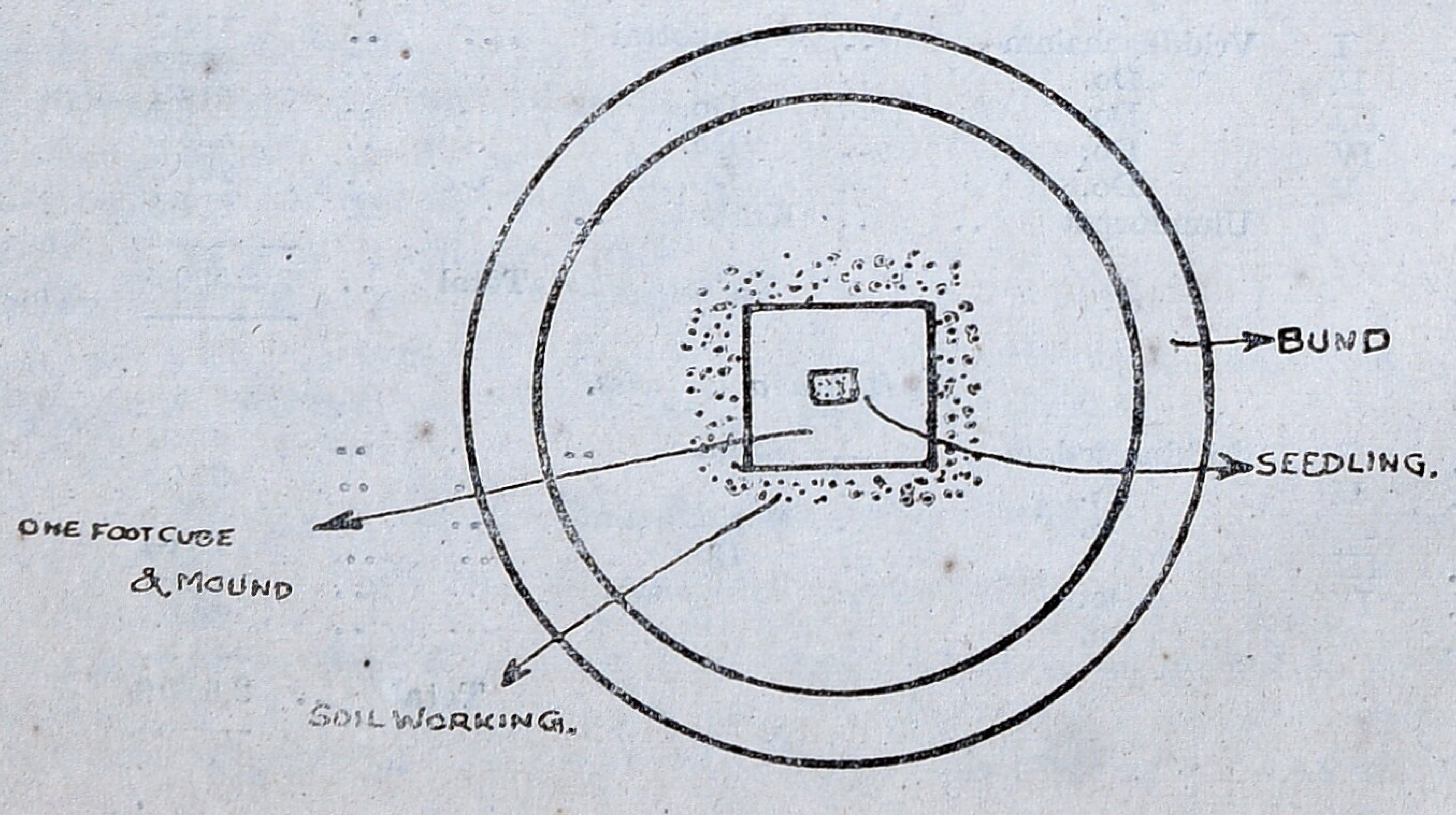
265. If it is contemplated to regenerate more areas with cashew, suitable areas from other working circles may be selected by the District Forest Officer.

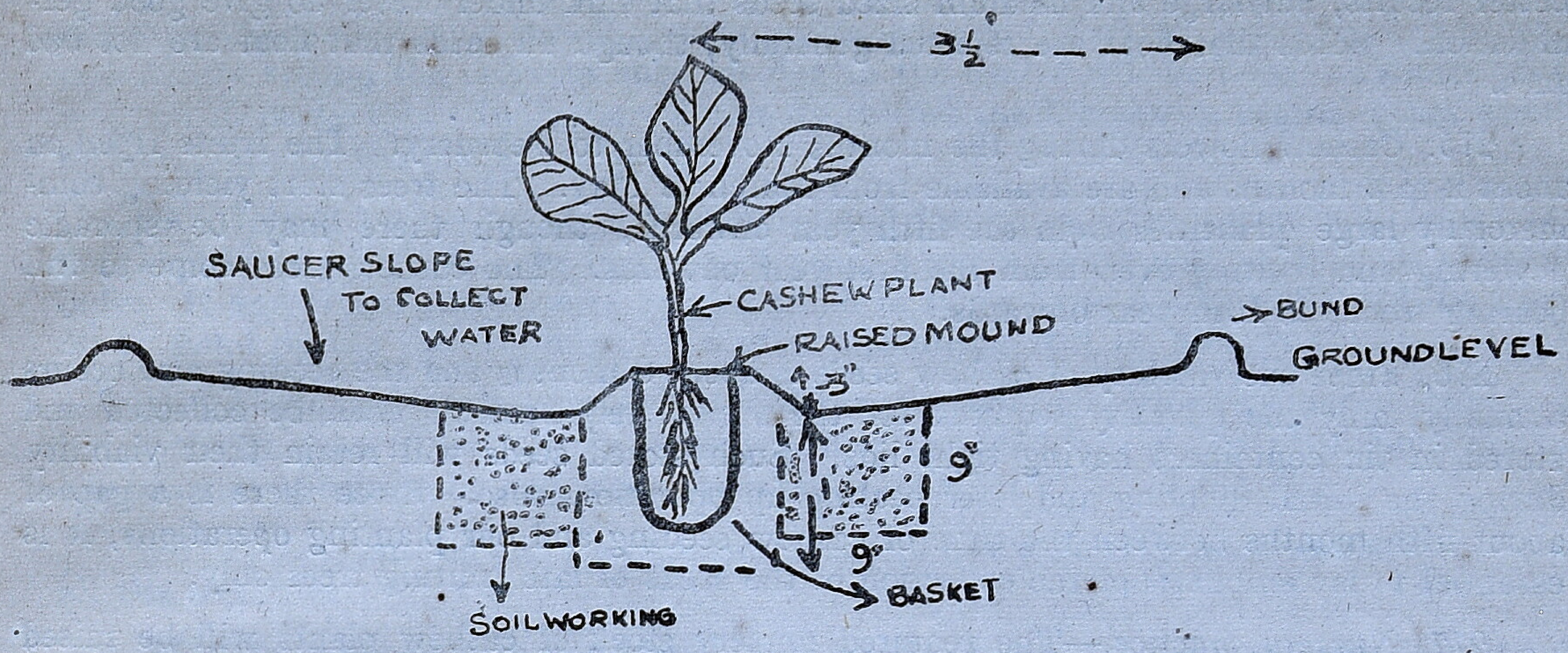
266. *Preparation of site.*—The annual coupes will be surveyed and clearly demarcated on the ground, by means of cleared lines of 12 feet width, in August of the year prior to the year of planting. The regeneration area will be divided into 10 equal plots of about 50 acres.

267. In October, planting lines at 33 feet apart will be aligned and all the growth to a width of 5 feet on either side of the aligned line will be uprooted. Along each planting line staking at 16½ feet apart will be done to obtain stakes of espacement 33 feet by 16½ feet. At each stake, pits of 1 foot by 1 foot by 1 foot will be dug before the end of the North-East monsoon (i.e.), December and the dug-out soil allowed to weather during the hot season. During May of the year of planting the pits will be filled in. In June saucers will be made around each one foot cube pit already dug as shown in the diagram below :—

General layout.







NOTE.—The sketches are drawn not to scale.

268. After the saucer is formed around the regeneration spot the centre of the saucer will be made to have a slightly raised platform with the available soil so that it may receive the seed or seedling, as shown in the diagram. The slanting surface of the saucers should be dressed clean so that they may aid in the conservation of maximum moisture. A bund will be erected along the periphery of the saucer. The work relating to the formation of saucers should be completed before the end of June.

269. *Planting.*—After the soil had cooled down as a result of one or two good showers of rain following the hot summer, dibbling will be done in the month of July-August depending on local rainfall. Cashew seeds at the rate of one per regeneration spot will be sown with the stalk and facing upwards in a slanting position at the depth of 2 to 3 inches below the top surface of the regeneration spot. This can be easily done by holding the seed with the stalk and upwards slantingly between the thumb and the index finger and pushing the seed into the soil. The seeds generally germinate in about 8 to 10 days. Dibbling will be repeated twice or thrice till the end of September. All the failed saucer spots will be beaten up in the nursery transplants during the beginnig of north-east monsoon in October.

270. During dibbling and planting, the shape of the raised platform should be disturbed as little as possible in order to allow the cashew seedlings the benefit of the worked soil.

271. *Collection of seed.*—Since the object to produce the maximum quantity of nuts of export quality, it is quite essential that trees of higher yielding strain only are grown. Since no definitely isolated strains of seeds answering these requirements are available in the market ready for sale, great care should be bestowed in collecting seeds of the proper variety only. As far as possible, seeds from areas having almost the same locality factors as those of the planting site should only be used.

272. Two varieties of fruits are known to exist, viz., fruits with the pink thalamus and those with yellow thalamus. It is generally believed that fruits with yellow thalamus yield better nuts than the other variety. So, seeds of the yellow thalamus fruits will be collected as far as possible.

273. Mother trees, from which the seeds are collected should have low healthy crown. It is better to select healthy mother trees which occur in a group than stray, isolated good trees among most of the bad ones. Stunted and small sized trees should be excluded as a rule. About 3 lb. of seeds per acre will be required for regeneration purposes. Since the areas near about Panruti produce the best nuts, the total seed requirement of the Cuddalore, Saidapet, Chingleput division (i.e., for planting about 9,000 acres) will be purchased at Panruti. For this purpose, the District Forest Officer, Cuddalore, will select about 1,000 good mother trees, which are heavy yielders, i.e., those that yield more than 2,000 nuts or 25 lb. and collect seeds from them annually.

274. *Seed weight.*—Germination per cent and plant per cent 85 to 115 seeds weigh a pound depending on their quality. Germinative capacity and plant per cent of selected seeds come to about 98 per cent and of unselected seeds vary from 80 per cent to 90 per cent. No pre-treatment of seed is necessary and untreated seeds give good germination. Seeds retain their good viability. Sorting and selection of seeds do not give any significantly

better results, but large and medium sized seeds that sink under water do give good germination. Seeds that float are rejected generally, though all seeds that float are not bad ones.

275. Cashew flowers during the months November to February. The fruits ripen in about 2 to 3 months and are available from March to May. The trees start yielding commercially large quantities from the fifth year onwards, though there may be sporadic flowering and fruiting even from the first year onwards. The cashew trees come to full bearing from the 10th year onwards.

276. Since the viability of cashew seeds is about 8 months and the seeding also occurs annually, only the quantity required for the annual requirements shall be collected and stored in tin containers having tight lids. Such stored seeds will retain their viability during the initial dibbling and later beating up operations also. Since there is a gap of about fifth months between the time of cashew seeding and our planting operations, it is essential to lay emphasis of the collection of the seeds of late fruiting trees only.

277. *Nursery practice.*—The required nursery stock of cashew plants will be raised in containers filled with good loamy soil. Baskets made of bambo, areca spathes or other suitable material or mud-pots may be used as containers. They may be of circular shape with about 4½ inches in diameter, 9 inches long. According to the local resources available, the containers may be selected.

278. The idea of using small containers is to raise small seedlings in which the fleshy cotyledonous leaves have just disappeared. Thus, the starting of the nurseries will be so timed as to get planting stock of proper size. It is considered that if nurseries are started about one month before the actual date of planting, proper sized small seedlings will be obtained.

279. If containers liable to termite attack are used, they may be placed on raised platforms. A low *pandal* may be erected to provide shade from the sun. The containers will be filled with loamy soil and one seed per container will be sown at a depth of two to three inches in the same manner as prescribed for dibbling the seeds in the field in paragraph number 269. The containers will be watered regularly. For this purpose, it is essential to locate the nursery near a water source. If suitable water sources are not available, the necessary may be located in a place where a well can be sunk.

280. The nursery stock required for planting will have to be estimated by the District Forest Officer, after assessing the success of the dibbling done in the South-West monsoon. On the average, only about 30 per cent of the dibblings fail and will need planting with nursery stock.

281. *Purchase of containers.*—The interregnum between the South-West and North-East monsoons is so small that the District Forest Officer may not be able to secure the requisite quantity of containers. If the South-West monsoon fails, he will be forced to raise nursery plants for the entire area. Further, containers made of bamboo and areca are perishable and cannot be stored for more than one season. So, the District Forest Officer will arrange for about 30 per cent of containers made of material available locally every year, so that they are readily available in August. In addition, he will keep a reserve stock of about 70 per cent of containers made of 'Alkathene', which are not perishable and can be stored for years. The 'Alkathene' bags will serve as a stand-by only.

282. *Kumi cultivation.*—If there is demand for kumri cultivation, the area may be divided into 1 acre or 2 acres bits and leased out for cultivation. The period of lease will not be for more than five years, with the lease being renewable annually, at the discretion of the District Forest Officer. If the areas are leased out for kumri cultivation, the cost of celarance of intervening growth between the lines will be reduced considerably and so *kumri* cultivation will be encouraged.

283. *Replacing casualties.*—All banks not sucessfully regenerated by dibbing will be taken up during north-east monsoon. During the north-east monsoon, since established container plants are used, generally no casualties will occur. If any occur due to insect or other damage, replacement will be done forthwith. Normally, the replacement of casualties will not exceed 5 per cent of the planting stock. But some of the seedlings planted late in the season die during summer.

Section 5—Subsidiary Silvicultural regulations.

284. *Weeding.*—Since cashew is an exotic, and does not tolerate root competition, it is essential to keep the plants free from competition from the weeds. It is because of this reason, the saucer spot should always be kept clean of weeds, as far as possible. In order to achieve this object, the following weeding regime is prescribed.

285. *First year.*—In September and December the saucers will be scrapped and kept clean of weeds. During the December operations, soil working to a depth and width of 9 inches around the one foot cube pit dug in the centre will be done, as shown in the diagram in paragraph. In January-February, before the hot season begins, a hot weather mulching around the plants will be done.

286. *Second year.*—In May, September and December, the saucers will be scrapped and kept clean of weeds. As in the first year, a soil working will be done in December only. If any of the plants were formed to be in flower, the flower stalks will be nipped off by hand during the weedings. No other operations will be necessary.

287. *Third and fourth years.*—No weedings are being prescribed as routine operations; but if the District Forest Officer, considers that the condition of the plantations warrant one or more weedings, he may carry them out.

288. Creeper cutting and maintenance of the 10 feet wide strip lines will be done during all the weedings.

289. *Thinnings.*—It is considered that no thinnings will be required. During the 10th year, the plantations may be inspected and if a thinning is considered necessary every alternate tree along the planting lines of 33 feet may be removed to obtain an espacement of 33 by 33 feet.

290. *Yield from thinnings.*—Since it is anticipated that all plantations will not undergo thinnings, the yield from thinnings is considered negligible. The produce available from thinnings, will be billeted, arranged into fuel stacks and sold in open auction.

291. *Clearing of intervening growth.*—If the intervening growth between the 10 feet cleared strips complete with the growth of cashew trees, they will be removed to the extent desired, as and when necessary except the belts around each 50 plot as a precaution against the dangers of monocultures over large tracts. If there is demand for *kumri* cultivation, the *kumridars* will clear the intervening for cultivation.

292. *Care and maintenance.*—In order to afford the necessary care and maintenance required for these plantations each 50 acres plot will be entrusted to the care of a 'Head-mazdoor'. He will be expected to supervise and carry out the various cultural and tending operations in his plot. During the second year, as only cultural and tending operations will be carried out, one 'Head-mazdoor' for every 100 acres only will be maintained. In the third year head-mazdoors will be employed at the rate of one for every 250 acres.

293. During the first two years, one forester will be placed in charge of each 500 acres coupe in each series. From the third year onwards, one forest guard and one watcher will be placed in charge of each coupe of about 500 acres of cashew plantations and one forester for every 1,000 acres of cashew plantations.

Section 6—Other Regulations.

294. *Sale of produce.*—The cashew nut topes will be sold after they are 5 years old, i.e., from the sixth year onwards. But they may be sold earlier also, if adequate quantity of nuts are formed. Each plot of 50 acres will be treated as unit and sold in open auction every year. The lease period will be six months from 1st January to 30th June. The details of revenue anticipated are furnished in paragraph.

295. *Pest control.*—If the plantations are infested with any of the diseases, proper remedial measures will be undertaken. A list of the pests and the remedial measures for them are given in Appendix V.

296. It is suggested a 'Plant Pathologist' may be appointed and the necessary conveniences of laboratory and field staff, given to him to combat the pests. This is essential in view of the large scale plantations envisaged for regeneration in this working circle and as the District Forest Officer may not be fully equipped for the job on hand and may not find adequate time for this specialised work in addition to his multifarious duties.

297. *Fire protection.*—In coupes, where the existing growth has been completely uprooted throughout the area as in Sidevi 1956 cashew plot, the ground is covered with profuse grass and it may be a source of fire danger in the hot months. To minimise the incidence of fires in such cleared areas, the following fire lines will be maintained :—

(i) Along the outer periphery, inside the dead fence a half chain belt completely scrap off all vegetation; and

(ii) The 10 feet wide common boundary lines between the plots of 50 acres.

The above lines will be cleared before the end of January and will be maintained clean of all vegetation by the head-mazdoors.

298. These fire protection operations will be carried out during the first three years only.

299. In coupes, in which all the growth has not been cleared and the intervening growth is allowed to remain no fire-protection operations will be done.

300. *Soil conservation measures.*—Since the forest cover is clearfelled and uprooted, completely throughout the coupes under *kumri* cultivation and partially in strips in other areas ,soil conservation measures are essential to minimise erosion. The following soil conservation measures are recommended :—

(i) Aligning the initial 33 feet apart planting lines along the country taking into consideration the general contours of the country.

(ii) In coupe for *kumri* cultivation and in which complete clear felling and uprooted of forest growth has taken place, construction of bunds at suitable intervals along the contours to prevent surface run off. The bunds will be maintained in fact for the first three years. In coupes where the intervening forest growth has been left uncut, such growth will afford the necessary soil protection to the area.

(iii) In spite of the above operations if erosion sets in, the District Forest Officer will take up immediate anti-erosion measures such as construction of checkdam, gully-plugging and others to minimise further erosion.

301. *Demarcation.*—Plantation will be demarcated by planting stones, showing the area and the year of planting at all prominent corners as well as the beginning and the end of the inspection paths during the first year itself.

302. *Grazing.*—Plantations will be closed to grazing for three years including the year of formation.

303. *Statistics.*—Figures of cost of formation and yield should be accurately maintained.

304. *Fencing.*—Live-thorn-fence will be erected around the coupes by adopting the method given in paragraph 356 in Chapter III, Part II.

305. *Cost of formation.*—The details of cost of formation per acre are given below :—

I. *First year*—

		RS.	NP.
(i)	Survey and demarcation of outer periphery by cutting 10′ wide lines.	0	31
(ii)	Demarcation of 50-acre bits by cutting 10′ wide lines	0	31
(iii)	Clearing the growth 10′ wide as regeneration strips and uprooting of stumps and roots up to a depth of 6″ and width of 6′.	15	50
(iv)	Raising a live-thorn-fence..	1	50
(v)	Forming a jeepable track within the regeneration area	1	0
(vi)	Aligning and staking for pits	0	19
(vii)	Forming saucers with a radius of 3′ having an inward slope of 3″ and digging of one-foot cube pit in the centre of the saucer.	4	0
(viii)	Refilling of excavated soil in pits and forming one-foot square mounds in pits.	0	50
(ix)	Cost of seeds and their transport to site at the rate of 3 lb. per acre.	1	50
(x)	Dibbling seeds	0	12
(xi)	Replacement of casualties i.e. sowings by sowings (20 per cent) and sowings by basket plants (25 per cent).	0	50
(xii)	Weeding and scrapping in September and December including December soil working and mulching in January-February.	4	50
(xiii)	Pay of head mazdoor for one year at the rate of one per 50 acres with a daily wage of Re. 1.	7	31
(xiv)	Raising a nursery for the basket plants	1	19
(xv)	Cost of tools, construction of watcher's shed, fire-tracing, etc. ..	1	57
	Total ..	40	00

	RS.	NP.
II. ***Second year—***		
(i) Weeding and scrapping in May—September and December including the soil workings	6	00
(ii) Pay of head mazdoor for one year at one per 100 acres with a daily wage of Re. 1.	3	69
(iii) Other expenses	0	31
Total ..	10	00
Total cost of formation per acre of cashew plantation	50	00

SECTION 7.

306. *Control.*—A control journal, control forms, nursery journal and ledger, plantation journal and ledger record of works and deviation statement will be maintained for this working circle. The details of the forms to be maintained are furnished in Appendix XII.

CHAPTER III.—WORKING PLAN FOR THE REHABILITATION WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF VEGETATION.

307. *General constitution.*—This working circle includes many of the ex-panchayat Reserved Forest areas which contain adequate depth of soil, and which are capable of being imported by techniques known at present.

308. *Character of vegetation.*—A full description of the forests has already been furnished in Chapter II, Part I. The forests included in this Working Circle cover all the different types of forests described therein.

SECTION 2—DIVISION OF AREA AND ANALYSIS OF CROP.

309. *Division of area.*—An area of 55,273.2 acres has been prescribed for regeneration operations. These areas have been divided into requisite number of planting series, wherever necessary, under each regeneration technique and the details are furnished under each regeneration technique.

310. *Analysis of crop.*—All the Reserved Forests were stock-mapped occularly in a general way to find out the most suitable regeneration technique to be followed. The details with reference to each Reserved Forest are furnished in Appendix XI.

311. *Position with reference to maps and area.*—The position with reference to maps is far from satisfactory while large-scale outlines of the Reserved Forests were invariably available, contour maps were not available in most cases. In some cases—even large-scale outlines had to be prepared from 1 inch to 1 mile—Survey of India sheet using pantographs. This resulted in not obtaining all the smaller details of the contours and boundaries of Reserved Forest in full relief. Since only occular stock-mapping was carried out, a map without contours was of a great handicap and resulted in the preparation of not very accurate stock-maps. Since uncut maps were not available in most cases, this also brought in some error while tracing them. Further, after these forests were taken over by the Department, no verification of the boundaries has been done. In a few cases where encroachments were suspected, the District Forest Officer has been informed for taking suitable action. All inaccuracies and errors have been avoided as far as possible, in the preparation of the final coupe maps. The coupe areas have only been computed using planimeter and they have not been actually surveyed in the field. So, the coupes laid out and their areas indicated, will in general, approximate to those given in the working plan. But, when the Special Range Officer and his staff provided in paragraph 37 for the rectification of the boundaries and preparation of maps . . . complete their work, most of these discrepancies will disappear.

SECTION 3—METHOD OF TREATMENT.

A. General.

312. *Special objects of management.*—The following are the special objects of management :—

(i) To convert the entire area of degraded forests into better type of fuel-*cum*-small timber forest in as short a time as possible, by planting suitable tree species and to develop them to the maximum extent ; and

(ii) to ensure the maximum net revenue obtained on a sustained yield basis by adoption of a suitable rotation and of such measures as would lead to maintence and improvement of site quality.

313. *Masures to attain the special objects of management.*—To attain the above special objects of management, it has been decided to treat the existing growing stock silviculturally by prescribing suitable measures to their condition. In order to ascertain the proper technique areas which contain at 25 feet to 30 feet apart, adequate number of active tree slumps, trees, pole crop, saplings or established seedlings sufficient to reclothe the forest if given protection, were separated from the rest of the areas. Such areas may or may not contain saleable tree growth. The areas which contain saleable tree growth will be worked under coppice regeneration method by working them as fuel coupes and resulting coppice growth will be assisted by artificial regeneration methods wherever necessary, in order to get complete stocking of the area (Method A). Those areas which do not contain saleable growth but contain only immature growth, will be tended and allowed to grow full maturity. In these areas, blanks which contain poor stocking of valuable species, i.e., than 25 feet to 30 feet apart will be artificially regenrated (Method ' B '). In the rest of the areas, which contain poor stocking of valauble species, (i.e.) less than 25 feet to 30 feet apart intensive artificial regeneration operations will be done (Method ' C '). The artificial regeneration method adopted will be the one that is in vogue at the time of regenerating the area as the proper regeneration technique of the dry fuel forests is still in the process of development. The regenerated areas will be properly tended and looked after so that they may grow into plantations of valuable species which will yield the necessary timber, firewood, minor and other forest products.

314. *Choice of species.*—The tree species that are indigenous to the locality, that are valuable as small timber and firewood and that can be grown easily, will be used. The species suggested, in order of importance and utility, are *Albizzia lebek, Dalbergia sissoo, neem, Cashew, Albizzia amara, Cassia siamea, Pongamia glabra, Eucalyptus hybrid, Tamarindus indica, Acacia lueeophloea, Acacia Arabica and Acacia sundra.* Other species, if found suitable, may also be used.

315. *Silvicultural system.*—Since different methods are adopted to suit different localities, the details of silvicultural system adopted are furnished under each technique separately.

316. *Conversion period.*—A conversion period of twelve years will be adopted. It is anticipated to cover the entire area during this conversion period.

317. *Rotation.*—The question of rotation during the Working Plan period, is only of theoretical interest as the forests are under conversion. After conversion has been completed, probably a rotation of thirty years may be followed.

318. *Regulation of yield.*—Since the object of this Working Circle is to rehabilitate the degraded forests by suitable regeneration methods, the exploitation of these forests will be of secondary importance only. While equal annual regeneration areas have been laid out, no attempt has been made to secure equi-productive areas.

B. Regeneration methods.

319. *General.*—The treatments proposed are based on the stock-maps prepared by occular estimate. While selecting demarcating an area for one or other of the treatment, the territorial staff will have discretion to vary the treatment suggested according to practical convenience, as all treatments aim at the common object of rehabilitation of the forests.

320. *Seed collection.*—The District Forest Officer will decide the species that he proposes to regenerate from the list already furnished in paragraph No. 314 according to the local conditions and make arrangements for their collection. As far as possible, fresh seeds should be used and storing should be avoided. The collection of seeds will be undertaken during the north-east monsoon of the year prior to that of regeneration and the following hot season. It is considered that one Madras measure of husked seed will be sufficient for the entire regeneration operations for one acre. The collection of seeds for the regeneration operations may be based on the above estimate.

321. *Nursery.*—In case of method ' A ' regeneration areas, nursery stock for the entire area will be raised as transplants will be used for stocking the area.

322. It is expected that under method ' C ' probably about 60 per cent of the regeneration spots will require replacements by transplants during the north-east monsoon. If good quality viable seeds are used, the percentage of transplants used may be less. The replacements in the Second Five Year Plan may not exceed 40 per cent. So it is essential to raise nursery beds in April to stock the entire regeneration area. It is better to produce as many container plants as is practicable.

323. The species recommended for nursery are *Albizzia lebbek* and *Dalbergia sissoo.* About 4½ lb. of *Albizzia lebbek* husked seeds and 1¼ lb. of *Dalbergia sissoo* pods respectively will be required for a nursery bed of standard size (40 feet by 4 feet by 1 foot). The nursery bed will be watered and raised about 6 to 9 months in advance of planting season.

Method ' A '—Areas which contain adequate stocking of valuable species, which are saleable—Type I (A and B).

324. As there are no areas falling under this method of regeneration, no areas have been allotted.

Method ' B '—Areas which contain adequate stocking of valuable species which are not saleable—Type I (A and B).

325. *Constitution and basis of selection.*—Areas which contain at 25 feet to 30 feet adequate number of active tree stumps, trees, pole crop, saplings and established seedlings sufficient to reclothe the forests, if given protection, and which are not saleable as fuel coupes are included in this method. This method covers all the forests situated in the plains and hills. The total area available is 38,929.4 acres and the following seven series have been formed for the purposes of regeneration :—

(1) Iraiyur Series.
(2) Thyagadurgam Series.
(3) Veppur Series.
(4) Manalurpet Series.
(5) Maiyanur Series.
(6) Sankarapuram Series.
(7) Vetavalem Series.

326. *Division into coupes.*—Each series has been divided into 12 coupes. The coupes have been so formed as to avoid contiguous series of closed coupes near villages. The statements that follow give the details of the coupes and their area for each regeneration series :—

(1) *Iraiyur series.*

Year of regeneration. (1)	*Coupe number.* (2)	*Name of reserved forest.* (3)	*Area in acres.* (4)	*Remarks.* (5)
1956 ..	.. I	Nathamur Reserved Forest—Bit I (part)	483·2	..
1957 ..	.. II	Do.	483·6	..
1958 ..	.. III	Sidevi Reserved Forest (part)	458·1	..
1959 ..	.. IV	Nathamur Reserved Forest—Bit I (part)	524·8	..
1960 ..	.. V	Do.	476·3	..
1961 ..	.. VI	Sidevi Reserved Forest (part)	459·5	..
1962 ..	.. VII	Nathamur Reserved Forest—Bit I (part)	481·9	..
1963 ..	.. VIII	Do.	451·6	..
1964 ..	.. IX	Sidevi Reserved Forest (part) .. .. Kunjaram Reserved Forest (part)	247·9 212·5	..
1965 ..	.. X	Nathamur Reserved Forest—Bit I (part)	486·2	..
1966 ..	.. XI	Sidevi Reserved Forest (part)	458·0	..
1967 ..	.. XII	Kunjaram Reserved Forest	462·5	..
		Total ..	5,686·1	

(2) *Thyagadurgam series.*

1956 ..	.. I	Varanjaram Reserved Forest (part)	520·7	..
1957 ..	.. II	Alwarmalai Reserved Forest (part)	511·4	..
1958 ..	.. III	Do.	504·8	..
1959 ..	.. IV	Varanjaram Reserved Forest (part) .. .. Porasakurichi Reserved Forest (part)	307·1 222·3	..
1960 ..	.. V	Alwarmalai Reserved Forest (part)	503·2	..
1961 ..	.. VI	Do.	464·4	..
1962 ..	.. VII	Porasakurichi Reserved Forest (part)	526·9	..
1963 ..	.. VIII	Alwarmalai Reserved Forest (part)	509·2	..
1964 ..	.. IX	Do.	479·2	..
1965 ..	.. X	Do.	504·0	..
1966 ..	.. XI	Do.	510·2	..
1967 ..	.. XII	Do. .. .. .. Sittal Reserved Forest (part)	177·2 305·5	
		Total ..	6,046·1	

(3) *Veppuseresri.*

Year of regeneration.	*Coupe number.*	*Name of reserved forest.*	*Area in acres.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)
1956	I	Nangur Reserved Forest (part)	424·7	..
1957	II	Kattumailur Reserved Forest (part)	366·9	..
1958	III	Do.	372·3	..
1959	IV	Nangur Reserved Forest (part)	419·7	..
1960	V	Kattumailur Reserved Forest (part)	365·7	..
1961	VI	Magarur Reserved Forest (part)	362·3	..
1962	VII	Mangur Reserved Forest (part)	419·1	..
1963	VIII	Kattumailur Reserved Forest (part)	365·1	..
1964	IX	Magarur Reserved Forest (part)	365·1	..
1965	X	Nangur Reserved Forest (part)	423·2	..
1966	XI	Kattumailur Reserved Forest (part)	362·1	..
1967	XII	Magarur Reserved Forest (part)	365·1	..
		Total ..	4,611·8	

(4) *Manalurpet series.*

1956	I	Athipakkam Reserved Forest (part)	569·4	..
1957	II	Do.	559·7	..
1958	III	Kanankadu Reserved Forest (part)	538·8	..
1959	IV	Athipakkam Reserved Forest (part)	557·2	..
1960	V	Do.	210·4 }	
		Kanankadu Reserved Forest (part)	316·4 }	
1961	VI	Do.	499·9	..
1962	VII	Athipakkam (part)	563·3	..
1963	VIII	Kanankadu (part)	535·3	..
1964	IX	Do.	497·6	..
1965	X	Athipakkam (part)	571·7	..
1966	XI	Kanankadu (part)	524·5	..
1967	XII	Do.	544·4	..
		Total ..	6,488·6	

(5) *Mayanur series.*

1956	I	Aviriyur Reserved Forest (part)	590·1	..
1957	II	Do.	588·4	..
1958	III	Swamimalai Reserved Forest (part)	574·1	..
1959	IV	Aviriyur Reserved Forest (part)	594·0	..
1960	V	Swamimalai Reserved Forest (part)	583·6	..
1961	VI	Do.	582·8	..
1962	VII	Aviriyur Reserved Forest (part)	576·2	..
1963	VIII	Swamimalai Reserved Forest (part)	575·3	..
1964	IX	Do.	593·8	..
1965	X	Aviriyur Reserved Forest (part)	590·6	..
1966	XI	Swamimalai Reserved Forest (part)	561·2	..
1967	XII	Do.	593·5	..
		Total ..	7,003·6	

(6) *Sankarapuram series.*

1956	I	Ravuthanallur Reserved Forest (part)	332·0	..
1957	II	Kadavanur Reserved Forest (part)	388·6	..
1958	III	Do.	394·0	..
1959	IV	Ravuthanallur Reserved Forest (part)	333·0	..
1960	V	Kadavanur Reserved Forest (part)	447·0	..
1961	VI	Do.	384·0	..
1962	VII	Kadavanur Reserved Forest (part)	385·0	..
1963	VIII	Do.	319·0	..
1964	IX	Do.	442·0	..
1965	X	Do.	395·0	..
1966	XI	Do.	392·1	..
1967	XII	Do.	448·0	
		Total ..	4,645·1	

(7) *Vetavalam series.*

Year of regeneration. (1)	*Coupe number.* (2)	*Name of reserved forest.* (3)	*Area in acres.* (4)	*Remarks.* (5)
1956 ..	.. I	Tachambattu Reserved Forest (part)	356·5	..
1957 ..	.. II	Do.	355·2	..
1958 ..	.. III	Nayamur Reserved Forest (part)	462·8	..
1959 ..	.. IV	Tachambattu Reserved Forest (part)	344·0	..
1960 ..	.. V	Do.	350·8	..
1961 ..	.. VI	Adukkam Reserved Forest (part)	357·5	..
1962 ..	.. VII	Tachambattu Reserved Forest (part)	335·2	..
1963 ..	.. VIII	Nayanam Reserved Forest (part)	425·5	..
1964 ..	.. IX	Adukkam Reserved Forest (part)	378·9	..
1965 ..	.. X	Tachambattu Reserved Forest (part)	352·4	..
1966 ..	.. XI	Nayanam Reserved Forest (part)	378·6	..
1967 ..	.. XII	Adukkam Reserved Forest (part)	350·7	..
		Total ..	4,448·1	

327. *Method of regeneration.*—One coupe in each series will be taken up annually in the sequence given in the previous paragraph. The coupes will be surveyed and demarcated in April of the year prior to that of regeneration. The coupe will be divided into equal plots of about 100 acres each.

328. If 'blanks', i.e., patches of forests not containing adequate tree growth of valuable species occur over 25 acres or more in extent, they will be clearly demarcated and regenerated by any of the methods given under method 'C', according to the nature of the country. The rest of the area will be protected as such and the immature growth allow to grow into a forest of valuable species.

329. *Tending.*—This wil consist of removal of noxious growth which oppresses or interferes with the growth of fuel species and climber cutting. These operations will be done during first and second years only. The head mazdoors will also attend to this work along with the other mazdoors engaged for this.

330. *Cost per acre.*—The rough cost of various items worked out per acre is furnished below :—

		Cost per acre RS.	N.P.
First Year—	(i) Survey and demarcation	0	25
	(ii) Raising of live thorn fence	1	50
	(iii) Tending	1	00
	(iv) Head mazdoors for 12 months one per 50 acres	3	62
	(v) Miscellaneous	0	63
	Total ..	7	00
Second Year—	(i) Tending	1	00
	(ii) Head mazdoors for 12 months one per 50 acres.	3	62
	(iii) Miscellaneous	0	38
	Total ..	5	00

Total Cost of rehabilitation : is Rs. 12 per acre.

Method 'C'—Areas which contain inadequate stocking of valuable species whether saleable or not constitution and basis of selection.

331. All forest areas in the plains and hills which contain sufficient depth of good soil for doing regeneration operations and which have not been taken up for regeneration under methods 'A' or 'B' are included for regeneration under this method. These forest areas do not contain at 25 to 30 feet adequate number of active tree stumps, trees, pole crop, saplings or established seedlings sufficient to reclothe the forests, but contain only sparse growth. In such areas if there is demand for kumri cultivation, kumri regeneration technique (Type II-Aa) will be adopted. For other areas situated in the plains (Type II A.C.ii) "Sunkenmound" or "Saucer" technique will be adopted for those on the hills (Type II B-a) "trench and mound" technique will be adopted.

(1) Kumri Renegeration Technique—Type II Aa.—As there was no demand for kumri regeneration in these areas, no areas have been allotted to this techinque.

(2) *"Saucer" or "Sunken-mound" or "Trench and mound" Regeneration Technique*: Types II Ab ii and II Ba.

The total area allotted to this regeneration technique is 16,343·8 acres and the following regeneration series have been formed.

(i) Kudiyanallur Series.

(ii) Anumanandal Series.

(iii) Siruvattur Series.

(iv) Attiyur Series.

334. *Division into annual coupes.*—The total area available under each series has been divided into 12 coupes. The coupes have been so formed as to avoid contiguous series of closed coupes near villages. The details of the coupes and their area under each series are furnished in the statements below :

Year of regeneration.	*Coupe number.*	*Name of reserved forest.*	*Area in acres.*
(1)	(2)	(3)	(4)
		(1) *Kudiyanallur series.*	
1956 ..	.. I	Sithal Reserved Forest (part)	593·2
1957 ..	.. II	Sidevi Reserved Forest—Bits 1 and 2	528·4
1958 ..	.. III	Nathamur Reserved Forest—Bit II (part)	523·6
1959 ..	.. IV	Sithal Reserved Forest (part)	473·0
1960 ..	.. V	Nathanur Reserved Forest—Bit II (part)	518·7
1961 ..	.. VI	Do.	562·9
1962 ..	.. VII	Alwarmalai Reserved Forest (part)	656·5
1963 ..	.. VIII	Nathamur Resrerved Forest —Bit II (part)	509·4
1964 ..	.. IX	Nathamur Reserved Forest—Bit I (part)	479·1
1965 ..	.. X	Alwarmalai Reserved Forest (part) .. .. .. Kunjaram Reserved Forest (part)	137·2 461·5 }
1966 ..	.. XI	Nathamur Reserved Forest—Bit II (part)	525·3
1967 ..	.. XII	Nathamur Reserved Forest—Bit I (part)	550·4
		Total ..	6,524·2
		(2) *Anumanandal series.*	
1956 ..	.. I	Krishnapuram Reserved Forest (part)	461·8
1957 ..	.. II	Do.	461·1
1958 ..	.. III	Do.	459·9
1959 ..	.. IV	Do.	461·3
1960 ..	.. V	Do.	455·9
1961 ..	.. VI	Do.	454·7
1962 ..	.. VII	Do.	456·2
1963 ..	.. VIII	Do.	463·7
1964 ..	.. IX	Do.	460·8
1965 ..	.. X	Do.	454·8
1966 ..	.. XI	Do.	458·3
1967 ..	.. XII	Do.	449·1
		Total ..	5,497·6

(3) *Siruvattur series.*

Year of regeneration.	*Coupe number.*	*Name of reserved forest.*	*Area in acres.*
(1)	(2)	(3)	(4)
1956 ..	.. I	Thottapadi Reserved Forest (part)	298·6
1957 ..	.. II	Do.	308·9
1958 ..	.. III	Kottalamalai Reserved Forest (part)	360·1
1959 ..	.. IV	Thottapadi Reserved Forest (part)	297·3
1960 ..	.. V	Kottalamalai Reserved Forest (part)	336·4
1961 ..	.. VI	Do	346·1
1962 ..	.. VII	Thottpadi Reserved Forest (part)	298·0
1963 ..	.. VIII	Kottalamalai Reserved Forest (part)	339·0
1964 ..	.. IX	Do.	337·5
1965 ..	.. X	Thottapadi Reserved Forest (part)	299·9
1966 ..	.. XI	Kottalamalai Reserved Forest (part)	337·0
1967 ..	.. XII	Do.	339·4
		Total ..	3,882·6

(4) *Attiyur series.*

1956 ..	.. I	Ravuthanallur Reserved Forest (part)	35·9
1957 ..	.. II	Do.	44·8
1958 ..	.. III	Athipakkam Reserved Forest (part)	30·0
1959 ..	.. IV	Ravuthanallur Reserved Forest (part)	37·0
1960 ..	.. V	Athipakkam Reserved Forest (part)	34·4
1961 ..	.. VI	Do.	40·5
1962 ..	.. VII	Ravuthanallur Reserved Forest (part)	35·5
1963 ..	.. VIII	Athipakkam Reserved Forest	34·5
1964 ..	.. IX	Do.	40·0
1965 ..	.. X	Ravuthnallur Reserved Forest (part)	35·5
1966 ..	.. XI	Athipakkam Reserved Forest (part)	31·3
1967 ..	.. XII	Do.	40·0
		Total ..	439·4

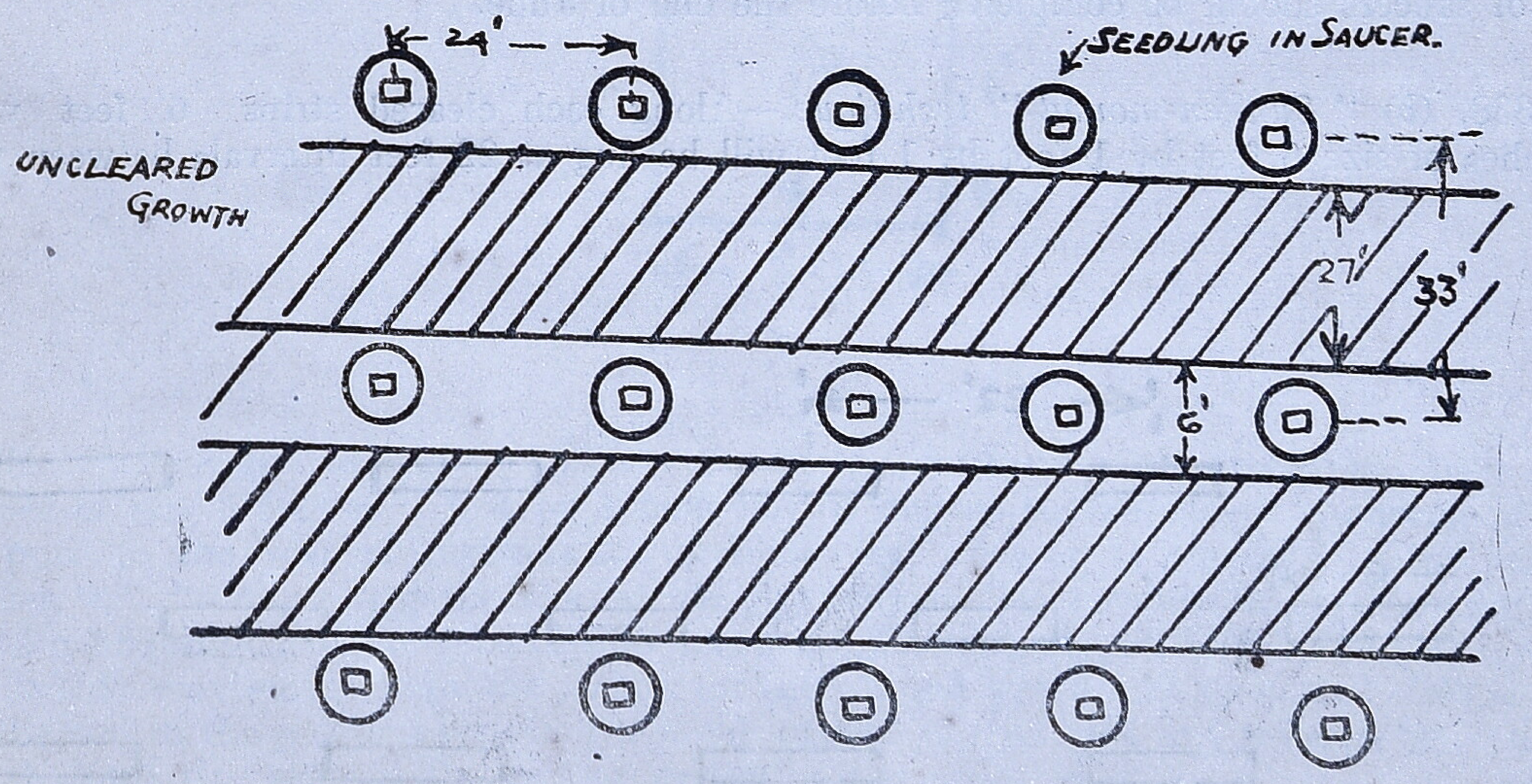
335. *Method of regeneration.*—The annual regeneration area will be surveyed and demarcated on the ground in April of the year prior to the year of regeneration. The regeneration area will be divided into plots of about 50 acres each and in each plot lines 6 feet wide will be cut at 33 feet intervals taking into consideration the general topography of the ground.

336 (*a*) " *Saucer* " *Regeneration Technique.*—Along each 6 feet wide line cut, staking at 22 feet apart will be done to obtain stakes at an espacement of 33 feet by 22 feet. At each stake, pits of size 1 foot by 1 foot by 1 foot will be dug before the end of the north-east monsoon, i.e., December and the dug-out soil allowed to weather during the hot season.

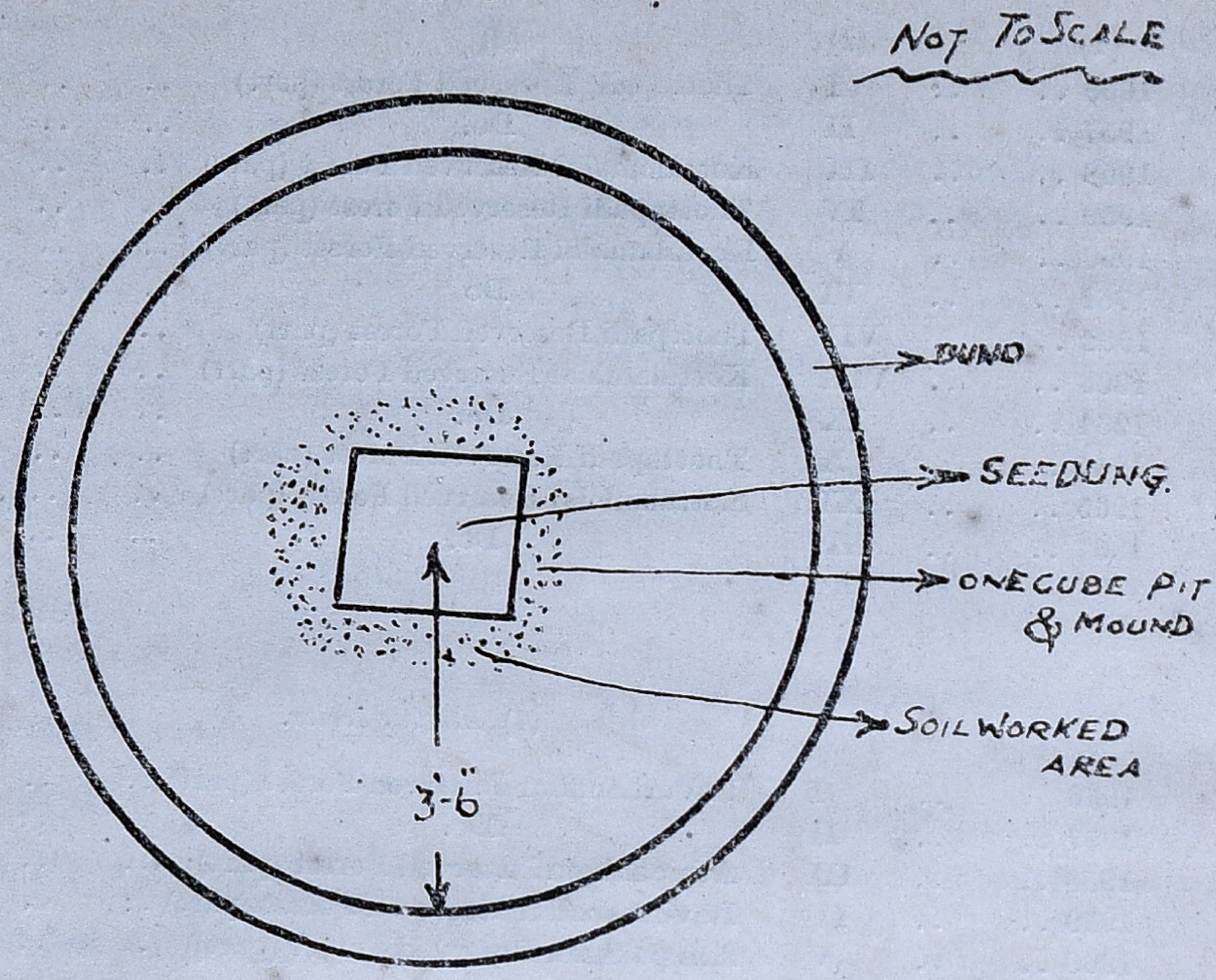
337. In April-May of the year of planting the pits will be refilled and saucers of radius 3 feet 6 inches will be made around each one foot cube pit dug, as shown in the diagram below :

(*a*) *General lay-out.*

(Not to scale.)

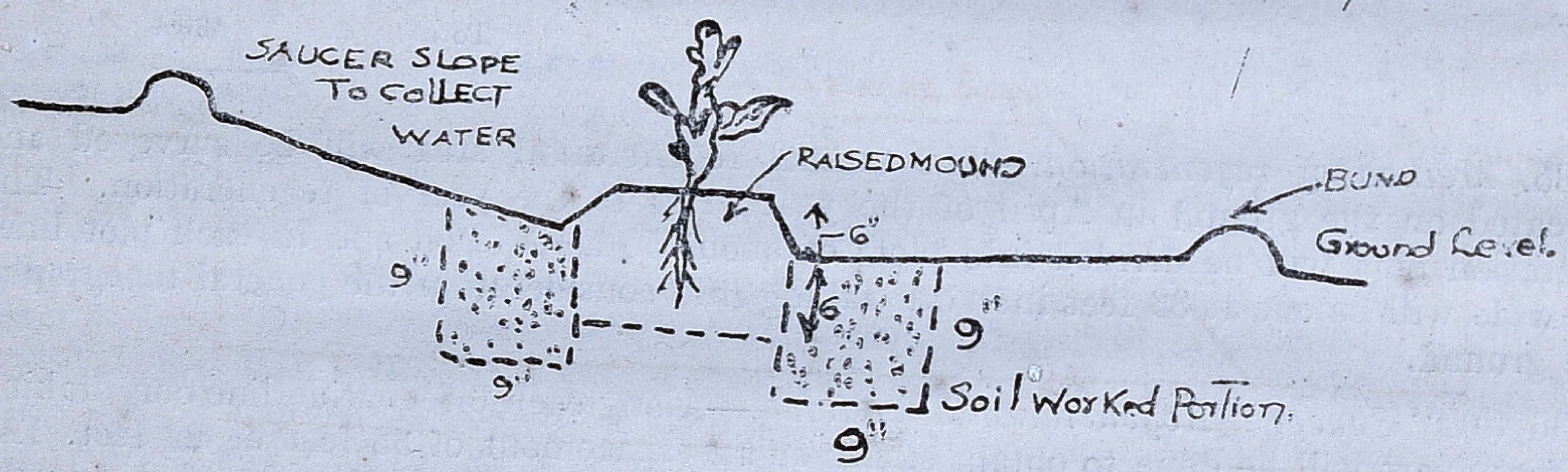


(b) SAUCER PLAN



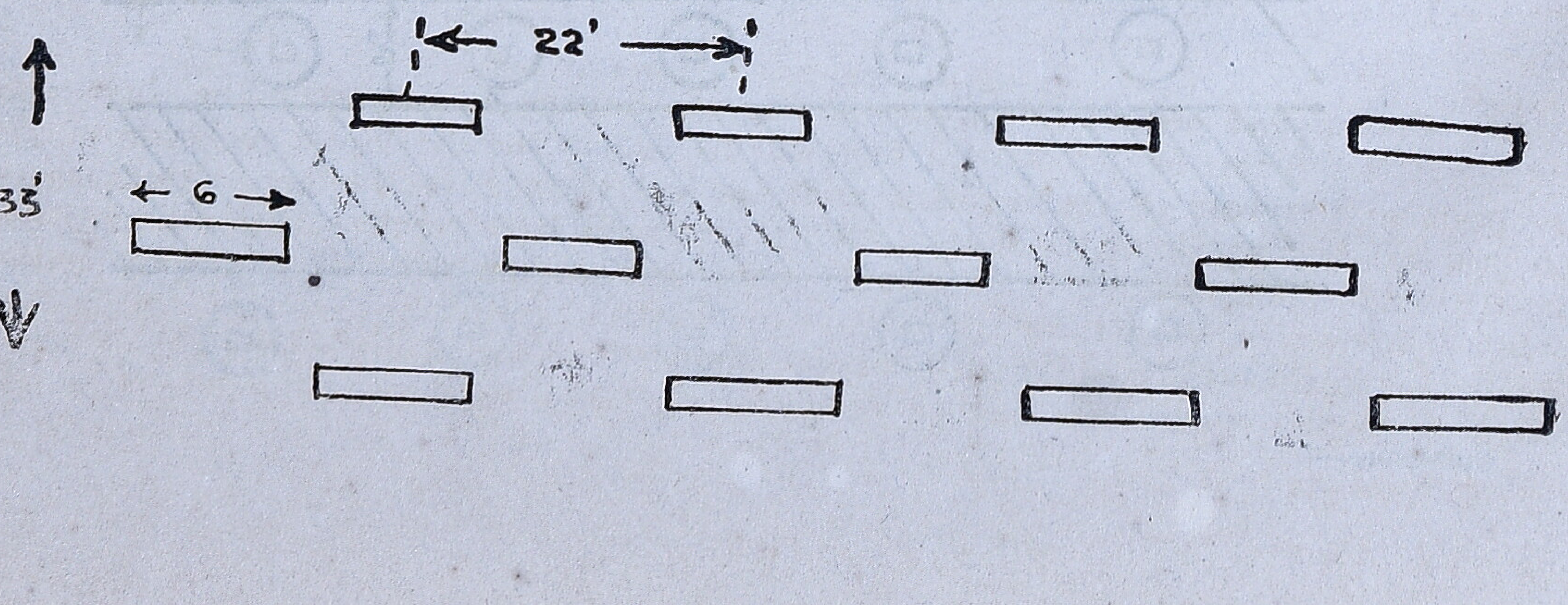
(c) SAUCER

SIDE ELEVATION



After the saucer is formed around the regeneration spot, the centre of the saucer will be made to have a slightly raised platform with the available soil, so that it may receive the seed or seedlings as shown in the diagram. The slanting surface of the saucers should be dressed clean so that they may aid in the conservation of maximum moisture. A bund will be erected along the periphery of the saucer. The work relating to the formation of saucers should be completed before the end of June.

338. (b) " *Sunken-mound* " *technique.*—Along each cleared strips 6 feet width trenches of size 6 feet by 1 foot by 1 foot will be dug at 22 feet intervals between their



mid-point during the north-east monsoon rains from October to December. The dug-up earth will be kept to one side for complete weathering during the hot season. In order to iminimise the washing away of the rub-up earth by rain, stones which will be aailable in the locality will in such a way placed to minimise the soil wash. The weathered soil will be placed May of the year of regeneration in the mid-central section of the trench only to form a raised flat mound. The top of the mound should be at least 2 feet. Then the base of the mound will be about 4 feet depending on the angle of repose of the soil in question. Top soil scraped from the sides may be put on the top of the mound to form a good seed bed. In other words, the mound will be formed inside the trench not filling it completely, so that the rain water may be collected in the unfilled end portions of the trench. The advantage of this method is that the seeds will have prepared seed beds of not less than 15 inches in depth and all available moisture will be fully conserved and made readily available to the plant. The diagrams below give the general lay-out mid-cross section and longitudinal section of the sunken-mound described above :

(*a*) *General lay-out.*

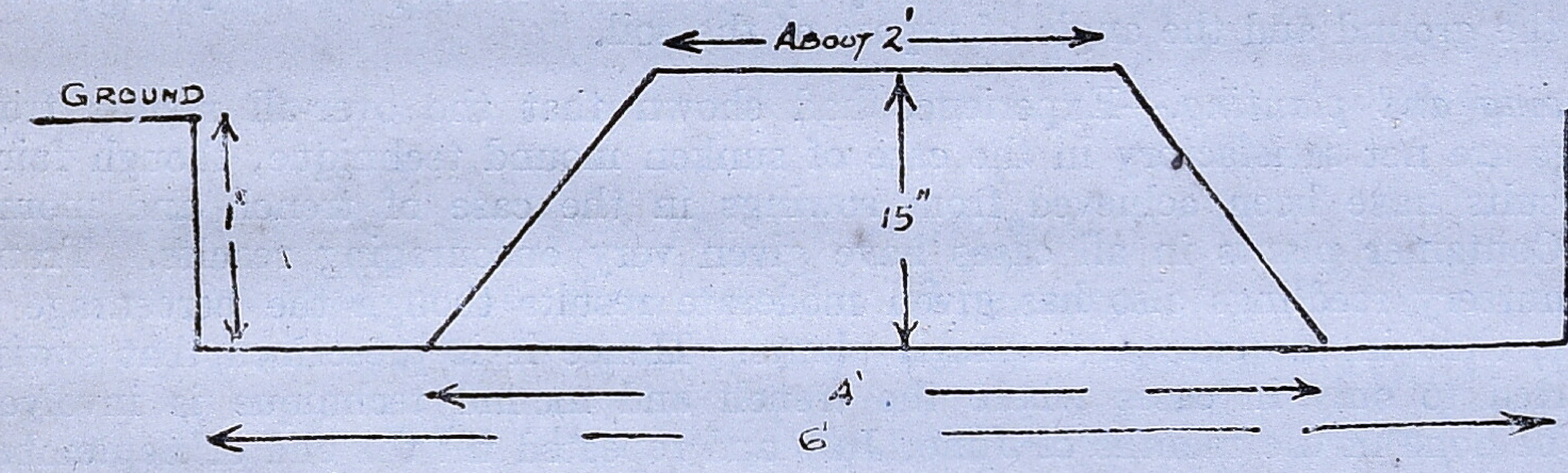
(Not to scale.)

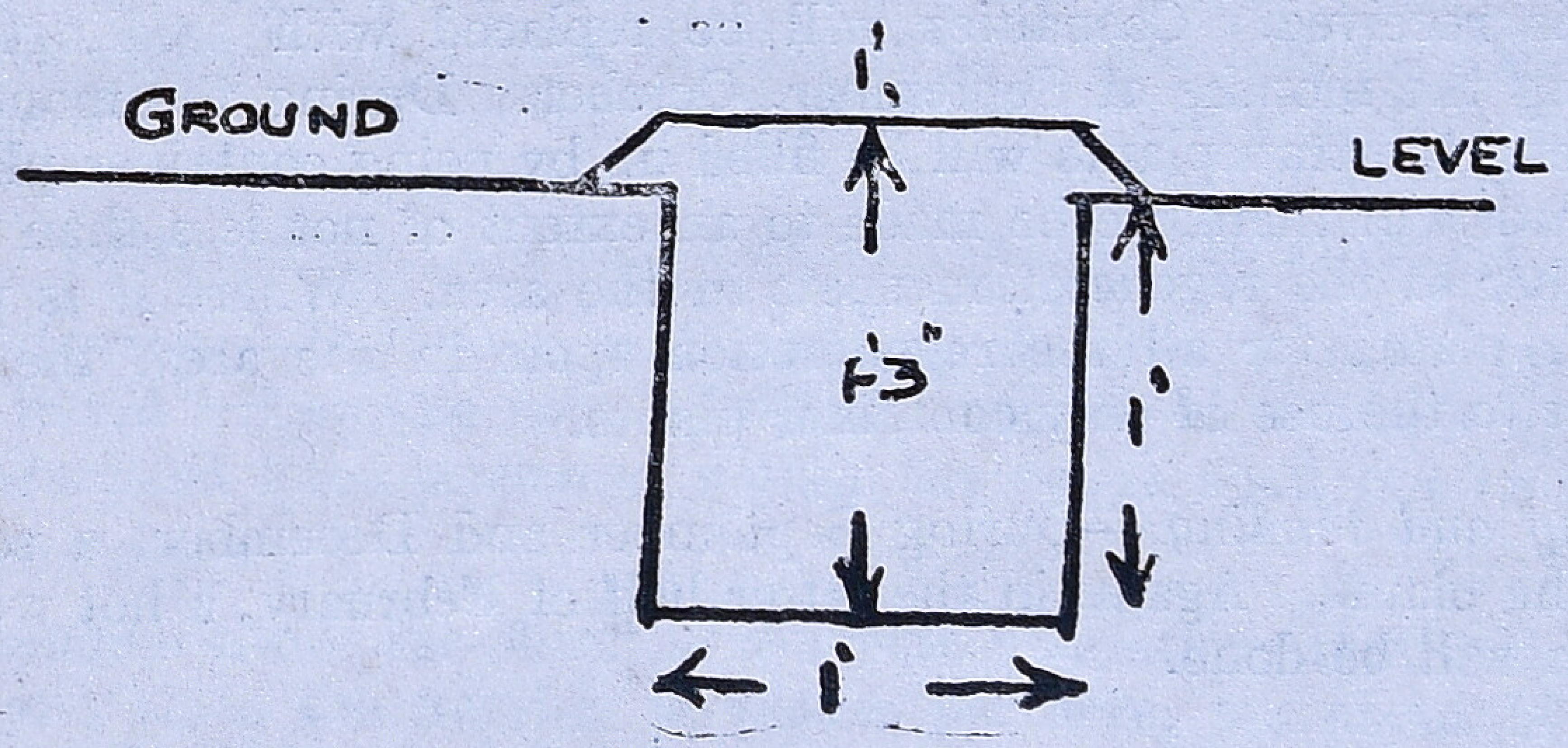
(*b*) *Longitudinal section of sunken mound.*

(Not to scale.)

(*c*) *Mid Cross-section of sunken mound.*

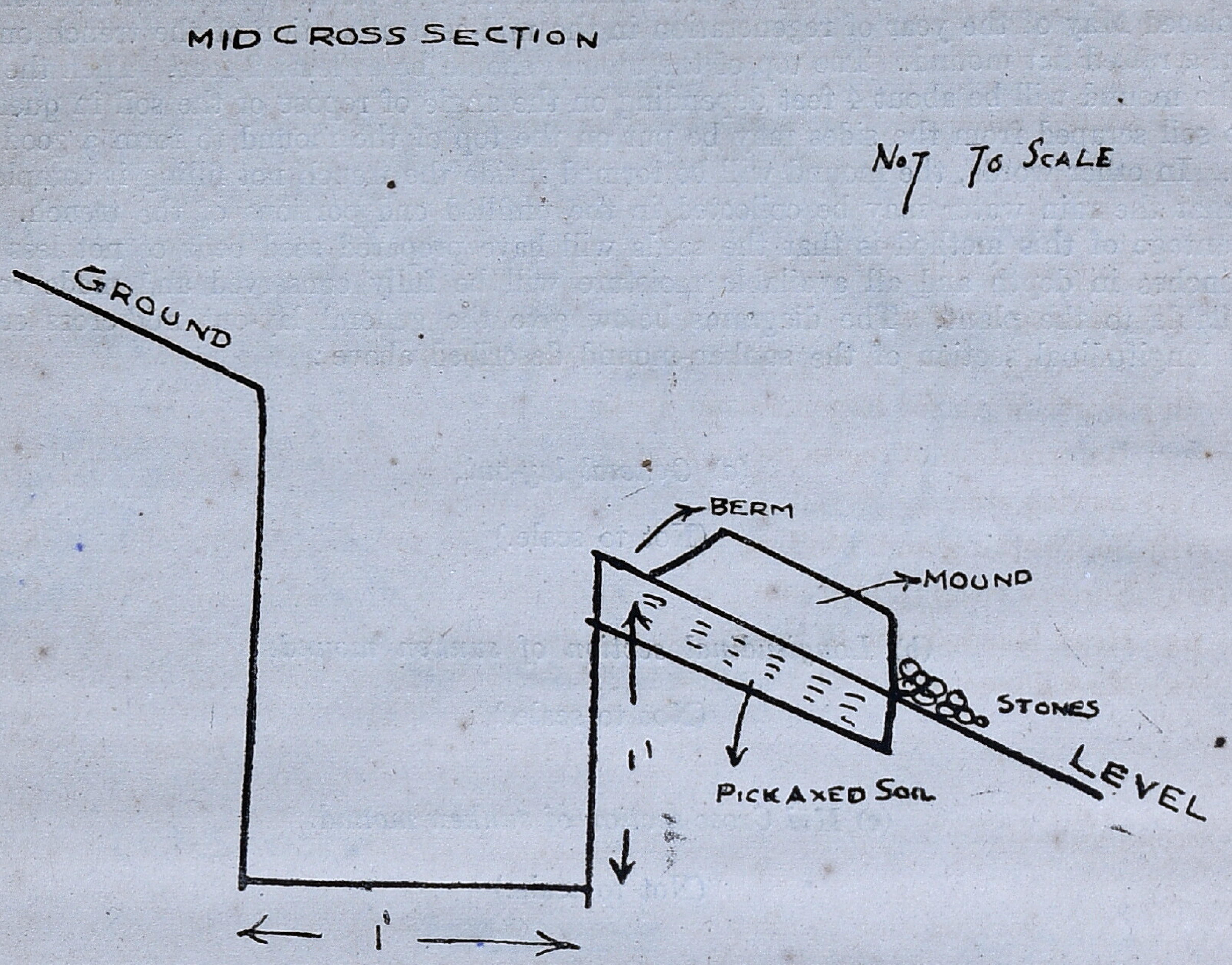
(Not to scale.)





339. *Trench and mound technique.*—As in the sunken-mound technique, here also trenches of size 6 feet by 1 foot by 1 foot will be dug in the north-east monsoon of the year prior to the year of regeneration and the soil allowed to weather. Since these trenches will be dug along the slopes, the lines should be carefully aligned taking the general configuration of the ground into account. The dug-up soil will be heaped on the low-hill side coextensive with the trench on the ground previously pick-axed. This will help the soil in the pick-axed portion and the mound to stay well and prevent their being washed down the slope. To further minimise the washing away of the soil, stones

obtained from trench excavation and those found nearby will be put on the lower side of the mound. The diagram below gives the details of the trench and mound prepared as above.



NOTE.—The dimensions of the mound are only approximate, as they will depend on the slope of the ground and the angle of repose of the soil.

340. *Sowing and planting.*—Experience had shown that the over-all results from direct sowings are not satisfactory in the case of sunken mound technique, though fairly successful results have been achieved from sowings in the case of trench and mound technique. Container plants in all cases have given very encouraging results. Transplanting of nursery seedlings also has given moderate results though the percentage of success is less than in the case of container plants. Hence it is prescribed that sowing will be resorted to only in cases where the trench and mound technique is involved. Sowing will be done in the months of June, July and repeated till the end of September. Thereafter replacements will be done using transplants obtained from the nursery or preferably container plants. In areas where the sunken mound technique or the saucer method is adopted, container plants will be planted on alternate lines. In the other lines, a nursery seedling not less than one foot and not more than three feet in height will be planted in each mound during the months of July–August as soon as a good shower of rain is received. Casualties will be replaced with seedlings obtained from the nursery during the months of September, October. During the month of November all casualties among the transplants will be filled up by using container plants. Provision for container plants will therefore be made to an extent of not less than 66 2/3 per cent of the total number of the regeneration spots in the area. Where it is possible to have entirely container plants for all the regeneration spots in the area, the District Forest Officer may resort to the use of only container plants.

341. *Weeding and tending.*—During September and December, a soil working will be done around the plants. Again, in the latter half of February, a hot weather mulching around the plants will be done.

342. During the second year, a soil working will be done in June-July, during the South West Monsoon in September after the South West Monsoon is over and in January, after the North-East monsoon is over. A hot weather mulching around the plant will be done along with the January operations.

343. *Replacement of casualties.*—Replacement of casualties with transplants or container plants based on experience will be done during the second year in October, as soon as the North-East monsoon has set in.

344. During the third year, a coil working around the plant will be done in September and in January.

345. Creeper cutting for the benefit of the plant will be done at each soil working during the first three years.

346. No other tending operations may be required beyond the third year. If found necessary by the District Forest Officer, they may be carried out.

347. *Estimate of Costs.*—A rough estimate of cost per acre is given below :—

A First Year—

	Cost per acre. RS.	nP.
(i) Survey and demarcation	0	25
(ii) Raising live fence	1	50
(iii) Clearing lines 6' wide (@ 2½ as per chain for 20 chains)	3	12
(iv) Earth work for Regeneration spots	5	50
(v) Reformation of regeneration spots	2	00
(vi) Sowing etc., ...	1	50
(vii) Soil working and Tending	6	00
(viii) Nursery costs (Lump sum)	0	50
(ix) Head Mazdoor for 12 months @ one per 50 acres	7	31
(x) Miscellaneous	0	32
Total ..	28	00

B. Second year—

	RS.	nP.
(i) Soil working and Tending..	6	00
(ii) Head-mazdoor for 12 months @ one per 100 acres	3	69
(iii) Miscellaneous	0	31
Total ...	10	00

C. Third year.—Same as second year : Rs. 10 per acre.

Therefore total cost for three years Rs. 48 per acre.

(3) *Hill top and Bouldery areas Regeneration Technique.*—Type II Bb.

348. No regeneration areas have been allotted under this technique.

349. *General.*—The regeneration techniques described in this chapter are all based on current experience. These will be followed till they are modified in the light of later experience or research. With experience, it may be possible to decrease the length of the trenches, increase their rain water storage capacity and arrive at the most suited technique of regenerating a quick growing species that is best suited to the locality. The problem of quick afforestation of low rainfall areas is still not completely settled though the present large scale experience has brought us very much near the solution.

Section 4—Subsidiary Silvicultural Regulations.

350. *Miscellaneous.*—Seedlings and saplings of other valuable species of economic importance, if found within the coupes will be encouraged to come up. All sandal and other notified standard trees occurring within the coupe shall not be cut but protected as standards.

351. *Thinnings.*—Since the object is to create plantations that will yield small timber and firewood, and since the number of plants per acre, are about 60, it is considered that no thinning will be required for these plantations.

Section 5—Other Regulations.

352. *Care and Maintenance.*—The regeneration area of each year in each series will be divided into 50 acre plots and entrusted to the care of a "Head-mazdoor" in order to afford the necessary care and maintenance required. The "Head-mazdoor" is expected to supervise and carry out the various cultural operations as creeper cutting, climber cutitng, freeing the young seedlings of useful species in hiis regeneration plot with the help of necessary labour force. He is also expected to maintain the water traps of the Regeneration Spots and the 6 feet wide planting lines throughout the year.

353. During the second and third year, as only cultural and tending operations will be carried out, one "Head-mazdoor" for every 100 acres only will be maintained.

354. One Forester will be placed in charge of about 500 acres of Regeneration area in each series, during the first three years. From the fourth year onwards, these areas will be protected just like other forests.

355. *Maintenance of old plantations.*—In the areas already regenerated in the various species, no cultural and tending operations will be carried out.

356. *Fencing.*—In the rehabilitation Scheme for the State, barbed wire fence has been recommended for fencing, but the efforts of the Department to get barbed wire which is still a controlled commodity has been of little avail. So it is prescribed that till barbed wire is secured, live thorn fence will be grown along the periphery by working the soil to a depth of 9 inches along 3 feet wide strip and sowing seeds of thorny species as *Acacias*, *Prosopis juliflora* and *Zizyphus* species at the commencement of the growing season. It is expected that these strips sown with thorny species will develop into good live fence in course of time. This work will be carried out along with the Regeneration Operations of the year. The necessity for barbed wire fencing may be reviewed in 1959 as so for regeneration operations have been carried out without the protection of barbed wires.

357. *Grazing.*—The Regeneration area will be closed to grazing for five years. In order to avoid large blocks of contiguous Regeneration areas near villages being closed to grazing, the coupes have been staggered as indicated below :

I, IV, VII, X, II, V, VIII, XI, III, VI, IX, XII.

358. *Demarcation stones.*—The Regeneration areas will be demarcated by planting stone slabs showing the year of formation and area in acres at the corners as well as the beginning and end of the inspection paths.

SECTION 6—CONTROL.

359. A control journal, control forms, plantation journal and ledger, nursery journal and ledger, Record of Works and Deviation Statement will be maintained for this Working circle. The details of the forms to be maintained are furnished in Appendix.

CHAPTER IV—WORKING PLAN FOR THE CASUARINA WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION AND THE CHARACTER OF VEGETATION.

360. *General Constitution.*—This Working Circle comprises the coastal forest areas situated in the Reserves and unreserves under the management of the department, which are considered suitable for raising casuriana. The existing Casuriana Plantations regenerated from 1950 onwards are included in this working circle. Some of these areas were sites of old casuarina plantations, which were not replanted after clearfelling as in Kille Reserved Forest and Pichavaram Reserved Forest.

361. *Character of Vegetation.*—A full description of the forests has already been given in Chapter II, Part 1. The areas selected for regeneration fall under Champions'—Moist Tropical seral forest types (*a*) Primary Seral types (1) 1 S/1—Beach Forest.

SECTION 2—DIVISION OF THE AREA.

362. *Area.*—The aggregate area of this Working Circle is 262 acres and is distributed as below :

(i) Existing Casuarina Plantations	143
(ii) Sites of felled casuarina plantations	119
Total ...	262

363. *Division into Planting series.*—The whole area has been constituted into one felling series, viz., Porto Novo Felling Series.

SECTION 3—METHOD OF TREATMENT.

A. The Annual Cut.

364. *Special objects of management.*—The following are the special objects of

(i) To progress to normal forest in course of time.

(ii) To ensure the maximum net Revenue obtainable on a sustained yield basis by the adoption of a suitable rotation and of such measure as would lead to maintenance and improvement of the site quality of the locality.

(iii) Consistent with the above objects of management, to continue to grow Casuarina plantations that yield the maximum quantity of firewood which is the best and the highest priced firewood in the market.

365. *Measures to attain the special objects of management.*—All the areas suitable for growing Casuarina will be planted up quickly and the annual fellings will be so arranged as to attain normalcy in the shortest period. The various regeneration operations will be made towards this end.

366. *Choice of Species.*—The keen growing demand for firewood, the high prices obtainable in the market, the quick growing nature of the species and the ease with which it can be regenerated, all point to the selection of Casuarina as the species most suited to satisfy the special objects of management.

367. *Silvicultural System.*—The system adopted will be clear-felling followed by concentrated artificial regeneration of casuarina.

368. *Rotation.*—No data for fixing the rotation for the casuarina plantations in this division could be collected for want of a complete series of age gradations of plantations. It is hoped that by the end of this Working Plan period, a complete series of age gradations of casuarina plantations would have come into existence and during the revision of this Working Plan, the necessary field data could be collected, analysed and the correct rotation fixed. Thus, in the absence of any local data, it is proposed to adopt the same rotation of nine years for these plantations also as that fixed for the Casuarina plantations in the Working Plan for the Chingleput Forest Division, (1956–57 to 1965–66) by Sri E. S. Thangam. Moreover, till recently, when the composite Chingleput Forest Division existed these plantations along with those in Chngleput Forest Division were treated as one Regeneration series and subjected to the same treatment.

369. *Determination of the annual cut.*—The distribution of the existing casuarina plantations is given below, with details of area and year of planting :—

Year of regeneration.	*Name of forest.*	*Area in acres.*
1950	Kille Reserved Forest	16
1955	Ariyakoshti U. R. L	82
1956	Porto Novo U. R. L	45
	Total	143

370. The old plantation sites which are proposed for Regeneration during this Working Plan period are distributed as below :—

Name of Reserved Forest.	Area in acres.
Pichavaram	35
Kille	84
Total ...	119

371. As already stated in paragraph No. 362 the total area of the casuarina regeneration series comes to be 262 acres. Adopting a rotation of nine years, the annual cut comes to be 262/9 = 29 acres.

372. In fixing up the anual Regeneration areas, some of the points which were taken into consideration were—

(i) No plantation should be prescribed for clear-felling before the completion of the rotation period;

(ii) a normal series of age gradations in casuarina plantations should be arrived at as early as possible;

(iii) the clear-felled old plantation sites should be reclothed in as short a time as possible;

(iv) equi-productive areas should be aimed at as far as they are compatible with the formation of complete series of age gradations aiming at normalcy.

373. Based on the above considerations, the annual areas have been fixed and the details are furnished in paragraph number 371. It can be seen that from 1964 onwards, equi-productive areas have been attained and from then onwards,a normal series of age gradations will be established, if the same rate of fellings are continued during the next Working Plan period also.

B. Felling and Regeneration.

374. *Selection of Regeneration areas.*—While casuarina has been found to grow in the interior also, it flourishes well only on the coastal tracts. So, the selection of areas has been confined to the coastal forests which do not support any good forest growth. Casuarina does not thrive on clayey or water-logged soils.

375. *Table of annual fellings.*—Based on the discussions made in paragraph number 373, the programme of annual felling has been fixed as below :—

Year of Regeneration.	*Name of forest.*	*Area in acres.*
1956	Porto Nove U. R. L	45.0
1957	Pichavaram R. F	16.0
1958	Do.	16.5
1959	Kille R. F	20.0
1960	Do.	14.4
1961	Do.	20.0
1962	Do.	19.8
1963	Do.	19.8
1964	Ariyakoshti U. R. L	27.0
1965	Do.	27.0
1966	Do.	28.0

376. *Felling and extraction.*—The areas proposed for clear-feeling in Casuarina plantations and natural forests will be surveyed and demarcated on the ground in November of the year prior to that of felling. At the time of survey, the regeneration area will be divided into blocks of about 25 acres each or less, for convenience of sale. The coupes will be sold in open auction early in January. The lease period will last for six months from 1st April.

377. As the areas that are clear-felled will have to be planted up during the following years, the following felling rules will be rigidly enforced :—

(1) The entire standing growth should be uprooted to 12 inches depth, billetted into 2 feet billets and formed into stacks of size 9 feet by 2 feet 3 feet.

(2) The area should be thoroughly felled to cover up extraction pits and facilitate subsequent planting operations.

Table of Annual Regeneration Areas.

378. The coupes prescribed for clear-felling will be planted up with Casuarina in the following year. As the table for clearfelling areas has already been furnished in paragraph number 375 a separate table is not furnished.

379. *Clearing and burning.*—The exploitation of a Casuarina plantation is very intensive. The branches, twigs and the roots are all removed and sold. The ground will then be levelled and made even for planting operations.

380. *Yield—(a) Casuarina Plantations.*—From the sample plot data given in paragraph number 235, it can be seen that the average yield per acre of plantation at the time of clear-felling comes to be 105.2 by 43/50 x 1/3=30 tons, where 1/3 is the form factor and 50 cubic feet=1 ton. The yield figures obtained from the past working of these forests varies from one to seven tons. So, on the average, the yield can be expected to be about 20 tons per acre.

(b) *Natural forests.*—These forests contain very little sealable growth. So, the yield and hence the revenue realised from these forests will be negligible.

381. *Aligning, stacking and pitting.*—The aligning and stacking at $8\frac{1}{2}$ feet by $8\frac{1}{2}$ feet and digging of 1 foot by 1 foot by 1 foot pits at each stake will be completed by the end of April. While aligning, the lines demarcating each sale unit of 25 acres will be maintained so as to serve as inspection paths.

382. *Collection of seeds*—Casuarina flowers and seeds twice a year viz., in May-June and December-January. The cones usually burst out in October-November. The fruits are the woody cones which dehisce when ripe and diseminate the seeds. Cones should be collected when they are ripe before dehiscence, from well-grown mature trees of not less than eight years only. Ripe cones are brownish in colour and so can be easily distinguished. The ripe cones collected are allowed to dry in the sun for a day or two and after the cones dehisce, the seeds are collected, dried and stored for sowing. As the seeds are liable to be easily blown away by wind, the seds are usually dried by spreading a piece of cloth over a country cot and on it to spread the cones and cover them with another cloth weighed down at the corners and put out in the cot in the sun. Seeds that burst from the cones on the first or second day of drying are considered fertile. As ants are very fond of the seeds, they should be protected against the ants by using

ash or Hexidol or Gammexene powder. The seeds are generally stored in earthern pots having tight fitting lids. The seeds are viable only for a few months. About one bag of ripe cones produce 1½ lb. dry seeds. The seeds weigh 20,000 to an ounce.

383. *Nursery practice.*—Temporary nursery sites will be selected close to or within the planting site in November of the year prior to that of regeneration. The nursery will be fenced around and a well dug in the middle of the site. The soil should be hoed to a depth of one foot well mixed up with sheep manure and beds of standard size (40 feet by 4 feet by 1 foot) formed. Sowing of seeds will be done in January. On the average, about 4 oz. of seeds per bed will be used. The seeds will be sown lightly and covered with sand and ash and then with Casuarina twigs and needles. The nursery beds will be watered both in the morning and in the evening by a can with a fine rose atachment. Germination will take place in about 15 days when the leaf cover will be removed. If red ants are found to carry the seeds away, copper sulphate solution made by dissolving one tola of copper sulphate in two seers of water will be sprinkled over the beds. Thereafter the beds can be watered as and when necessary. The seedlings develop rapidly and in about six to esven months reach a hight of 2 feet with a root 1½ feet long. No pricking out will be done normally; but in patches where the seedlings are found in thickets, the weaker seedlings may be planted out in a new bed.

384. A seed bed sown above will produce about 3,000 seedlings of planting size. While removing the seedlings from the nursery beds for transplanting, the nursery beds will be profusely watered and the seedlings removed by dismantling the bed. The seedlings should never be pulled out of the beds. The size of a good healthy planting seedling has a stem of 1½ feet to 2 feet length and a root, 1 foot to 1½ feet. The cardinal points for nursery practice are sowing lightly, judicious watering and no pricking out.

385. *Fencing.*—As Casuarina is susceptible to browsing and mechanical damage by cattle, a fence will be erected before the end of May (i.e.) before the actual planting operations begin. Efforts will be made to secure barbed wire, which is still a controlled commodity for use as fencing material. If barbed wire is not available in time, locally available material will be used for erecting a fence. The fence will be maintained for the first two years of the plantation only.

386. *Wells.*—Wells will be dug at the rate of one per three acres. The size of the wells is normally about 15 feet diameter at the top and six feet diameter at the bottom. Water is generally struck at a depth of 6 to 10 feet. Well rings made up of bundle Casuarina twigs and branches may be used to secure depth of water.

387. *Formation of plantation—(a) Planting.*—The planting of casuarina seedlings will be done in June–July, after the south-west monsoon has set in well. It has been found that late planting results in more casualties than early planting. Deep-root planting will be done. The planting stock will be selected at the nurseries themselves. Only healthy well-developed plants with 1½ feet height will be used. The fine particles of soil adhering to the roots will not be shaken off and planted as such, as they contain the valuable nitrogen fixing, mycorrhiza. While planting the seedlings, the tap root should be held straight in the pit at proper depth and planted without any bend. The soil should be moist at the time of planting and pressed on all sides without leaving any air space. The planting should be completed as quickly as possible within a few days of commencement.

388. *Watering.*—Watering is the most expensive item in raising Causarina plantations on sandy soils and the extent to which watering is required depends on several variations and on the condition of the plantation. The object of watering is not only to keep the plants alive but also to accelerate their growth during infancy. Watering will have to be done judiciously during the first three years as and when necessary. The man on the spot is the best judge to decide, as no hard and fast rule can be laid down. Every time watering is done, each plant gets about one gallon. One pot of water which is about two gallons is distributed among two plants and each trip, a mazdoor carries two pots. The required number of pots of two gallon capacity will be purchased and supplied to the mazdoor by the Range Officer in order to ensure that the plants get the maximum quantity of water. The mazdoors will not be allowed to use their own pots. The following regime of watering is prescribed :—

(i) *First Year.*—For the first ten days after planting, watering will be done twice a day unless there is rain. For the next 10 days, watering will be done on every alternate evening. The seedlings would have been established by this time. After this, the plants will be watered till the end of the first year at the rate of twice a week or more often, if found necessary due to break in the rains. More often watering may not be required after planting till the beginning of the first long summer drought, except during the intreval between the South-West and North-East monsoon in September. The criterion to do watering is whenever the soil is found to be dry after digging for about 6 inches and

if plants are found withering. Plants that have their leading shoots free and vigorous, grow well. The aim will be to stock the entire area with uniformly well grown seedlnigs. If the leading shoot is broken or withered, the plants become bushy and branchy. As soon as plant with withered tip is seen, a second seedling will be planted by its side. In filling up such casualties, specially vigorous seedlings will be used to cover up the time lag in growth and to avoid lateral shade from the neighbouring tall plants.

(ii) *Second Year.*—Watering will be done only to the plants that need it. In actual practice, this will amount to watering about half the total area twice a week in February and March and the whole plantation similarly from April to June. No watering will be generally required during the third and subsequent years. If found necessary, the District Forest Officer, may carry it out to the extent necessary.

Section 4—Subsidiary Silvicultural Regulations.

389. *Weeding.*—As casuarina cannot withstand root competition, it is essential to keep the plants free especially during the first few years of their establishment period.

The following weeding operations is prescribed.

(i) *First year* : In September and January scrapping to a raidus of 18 inches round the plants will be done. In February, a hot weather mulching around the plants will be done.

(ii) *Second year* : In July and December, scrapping to a radius of 18 inches round the plants will be done. No operations will be done in the third year. If found necessary, the District Forest Officer may carry out the operations to the extent necessary.

390. *Replacement of Casualties.*—Casualties will be replaced during the first year, immediately they are noticed. Every endeavour will be made to secure full stocking during the first year itself. For replacement of casualties, large-sized vigorously growing seedlings will be preferred. No casualty replacement will be done beyond the first year.

391. *Pruning.*—It is considered that free circulation of air among the saplings and poles of the Casuarina plantation is essential for proper development. So, pruning will be done in November in the fourth year, towards this end. At the same time, all dead and dying trees will be extracted.

392. The general rules for carrying out pruning are.—

(1) no pruning will be done for plants of height 6 inches and below ;

(2) all plants above 6 feet in height will be pruned to one third its height or to a maximum of 8 feet, from the ground level;

(3) a sharp knife should be used for pruning and care should be taken not to injure the bark;

(4) the plants pruned will be cut about one inch away from the stem;

(5) where there are more than one plant in a pit, the best will be retained and the rest cut flush with the ground level;

(6) dead stems, if found, will also be cut. The cut materials will be collected and heaped by the mazdoors during pruning. The entire operation will be done under the direct supervision of the Range Officer. The cut material will be sold in open auction. It is anticipated that the revenue realised by the sale of these cut materials will cover the cost of the pruning operations.

393. *Thinnings.*—No thinnings will be carried out, as the rotation is a short one.

394. *Demarcation Stones.*—The plantations will be demarcated by planting stone slabs showing the year of plantations, and area in acres at the corners as well as the beginning and end of the inspection paths.

395. *Grazing.*—The plantation will be closed to grazing for a period of three years.

396. *Experiments.*—The work done in Marakanam Research Garden has shown that *Eucalyptus* hybrid can be successfully grown in coastal tracts. In order to give this result a fair trial, it is prescribed that every year about 1 acre will be planted up with this species. About six month old nursery raised container plants will be used for planting. The necessary quantity of seeds will be obtained from the State Silviculturist, Madras.

397. If *Eucalyptus* hybrid is found to come up well after a trial for 5 years, the District Forest Officer may take up the question with the territorial Conservator of Forests, for increasing the annual regeneration area to the necessary extent.

398. *Fungus.*—The extraction of all dead and dying trees in the plantations and the working of the soil at the end of the rotation, are expected to reduce the fungus attack in the plantations.

SECTION 5—OTHER REGULATIONS.

399. *Rain Gauges.*—As it is desirable to have exact statistics about the number of rainy days and the quantity of rainfall in inches, in each of the coupes taken up for regeneration, it is suggested that Planter's Rain gauges will be installed in the centre of each of the coupes under regeneration during the first year. This will also indirectly serve as a check against the watering operations carried out in the plantations. The rainfall data collected will be posted in the plantation journal and ledger.

400. *Statistics.*—The quantity of firewood extracted by the contractor during the clearfelling of the coupes will be furnished to the Range Officer every month regularly. These data along with the details of monthly cost of raising the plantation will be posted regularly in the plantation journal and ledger.

401. *Cost of formation.*—The cost of formation of one acre of the casuarina plantations is given below :—

A. First year—	RS.	NP.
(i) Working the soil to a depth of 9"	15	75
(ii) Sinking circular wells	5	00
(iii) Aligning, staking at $8\frac{1}{2}' \times 8\frac{1}{2}'$ and pitting of one 1 cube pits ..	3	00
(iv) Uprooting and transporting seedlings from nursery to planting site and planting in pits	2	00
(v) Watering plants for the first 10 days at the rate of ½ pot of water per plant—3/5 mazdoor a day at 500 plants per mazdoor per day of watering, with wages Rs. 10 per day.	3	75
(vi) Watering for the next 10 days on every alternate day in the evening only at the same rate of labour as in item V. ..	0	94
(vii) Watering for the next 8 months from August to March, i. e, 32 weeks at the rate of twice a week in the evening at the same rate of labour as in item V	12	00
(viii) Making scoop around the plants to hold water (lump sum) ..	4	00
(ix) Maintenance of well during the year (lump sum)	3	00
(x) Weeding	3	00
(xi) Nursery costs	2	00
(xii) Replacement of casualties	1	00
(xiii) Erection of fence or barbed wire	5	00
(xiv) Miscellaneous	2	56
Total ..	63	00

B. Second year—	RS.	NP.
(i) Watering for 3 months from April to June, as in item vii above	4	50
(ii) Maintenance of well	2	00
(iii) Weeding.	2	00
(iv) Miscellaneous	0	50
Total ..	9	00

Therefore total cost of regeneration per acre .. .. Rs. 72.

SECTION 6—CONTROL.

402. A control journal, control forms, plantation journal and ledger, nursery journal and ledger; record of works, deviation statement and control maps will be maintained for this working circle as stated in Appendix XII.

CHAPTER V—WORKING PLAN FOR THE FUEL WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION AND CHARACTER OF VEGETATION.

403. *General Constitution.*—The fuel Working Circle consists of plains and hill forest areas of Reserved Forests which are reasonably well-stocked, which are accessible and in which exploitation is profitable. Steep-hill sides where the exploitation will be silviculturally undesirable and other poorly stocked area, have been excluded.

404. *Character of Vegetation.*—A detailed description of these forests has already been furnished in Chapter II, Part I. These forest areas fall under Champion's Type :—

(i) Carnatic evergreen forest-Group 6-Tropical dry evergreen forest.

(ii) Southern Cutch thorn forest-Group 5-A. Southern thorn forest-Type C.

(iii) Moist Tropical seral forest types :—

(a) Primary Seral Type-(2) 1 S/2-Tidal forest.

Section 2—Division of Area and Analysis of Crop.

405. *Area and Formation of Planting Series.*—A total area of 3,637 acres have been selected for working as fuel coupes. Two felling series, as detained below, have been formed 1. Pichavaram Felling Series, 2. Pavunjipatty Felling Series.

406. *Analysis of Crop.*—No analysis of crop was done, as there was not much variation in stocking warranting such detailed analysis.

Section 3—Method of Treatment.

407. *Special Objects of Management.*—The following are the special objects of management.

(i) to work these forests in such a way that the growing stock therein is kept at the maximum production capacity of perpetuity;

(ii) to meet the fuel needs of the villagers situated close to the forests, as far as possible, on a regular and sustained manner.

Measures to Attain the Special Objects of Management.

408. In order to attain the above special objects of management, fuel coupes of convenient blocks wil be formed and they wil be worked regularly by sale in open auction every year. The lay out and the method of working of these fuel coupes have been prescribed after taking into consideration the rate of growth of the growing stock in these forests so that the exploitation of these forests in the forms of fuel coupes can be continued in perpetuity.

409. *Silvicultural System.*—(a) *Pavunjipattu Felling Series*—The system adopted will be simple coppice, with the reservation of certain fruit yielding and other Minor Forest Produce yielding trees. Only healthy trees with well developed crowns and poles that are healthy and vigorously growing will be retained. Obviously unsound, diseased and over-mature trees will not be retained.

(b) *Pitchavaram Felling Series.*—The areas allotted to this Felling Series will be worked by adopting the uniform system. The mangrove forests contain evergreen tree species which do not coppice well and so about 15 mother trees per acre are left as seed bearers to stock the area.

410. As regeneration is prolific and there is no problem, no attempt has been made to allot the areas to the various periodic blocks. Due to difficulties involved in the collection of data and the consequential high expenditure, in relation to the revenue realised, it was considered that the details of the status of regeneration in each coupe was unnecessary. So, the coupe allotted for felling in each year may be treated as allotted areas of Periodic Block I and the rest, unallotted areas of other, Periodic Blocks and the clear-felling operation as the seeding felling operation.

411. *Felling Cycle.*—(a) *Pavunjipatty Felling Series.*—The firewood from this Felling series is supplied mainly to Madras City and the demand is for billets of 18 inches to 24 inches girth. The coppice regrowth is found to be vigorous and adequate, and complete their height growth within the first few years after felling. The present felling cycle followed is 35 years. At present no experimental data regarding the rate of growth of the coppice shoots exists. As it is considered that the trees will attain the size of 18 inches to 24 inches girth during this period, the same felling cycle will be continued.

(b) *Pichavaram Felling Series.*—Since the annual area exploited is small in this Felling Series, the fire wood is mainly locally used up. As plenty of casuarina firewood from the private topes are available in the market this produce is mainly purchased by lime kiln owners for making slaked lime. An indication of the felled coupes indicates proligic natural regeneration of valuable trees as *Agicerops* species, *Rhizopherra* species, etc., coming up, as a result of the seeding of the mother trees left as standards. In view of the absence of any data regarding the rate of growth of these evergreen species are generally slow grown, a felling cycle of 40 years appears to be low. Probably a longer felling cycle may have to be fixed. Due to the absence of any definite data in this regard, the existing felling cycle of 40 years will be continued and it is not possible to fix the rotation period.

412. *Regulation of Yield.*—The yield will be regulated by area.

413. *Calculation of Yield.*—Based on the average of the last few years, the annual yield for both the felling series is given below :—

(i) Pavunjipatty Feeling Series 6 tons per acre.

(ii) Pichavaram Felling Series 10 tons per acre.

SECTION 4—METHOD OF EXECUTING FELLINGS.

414. *Allotment of Coupes.*—The area under each felling series is divided by the felling cycle to obtain the average annual area and based on that average area, each year's regeneration area was alloted as indicated below :—

Coupe number.	Pavunjipatty felling series. Area in acres.	Pichavaram felling series. Area in acres.	Coupe number.	Pavunjipatty felling series. Area in acres.	Pichavaram felling series. Area in acres.
(1)	(2)	(3)	(1)	(2)	(3)
I	99	28	XXIII	99	28
II	101	28	XXIV	97	28
III	101	28	XXV	99	24
IV	97	28	XXVI	100	28
V	103	25	XXVII	97	28
VI	102	25	XXVIII	99	28
VII	100	32	XXIX	100	28
VIII	100	32	XXX	99	24
IX	104	32	XXXI	104	24
X	101	32	XXXII	105	36
XI	101	32	XXXIII	105	30
XII	100	32	XXXIV	104	28
XIII	98	32	XXXV	105	32
XIV	100	32	XXXVI	..	32
XV	103	32	XXXVII	..	34
XVI	104	32	XXXVIII	..	38
XVII	104	32	XXXIX	..	40
XVIII	99	32	XL	..	28
XIX	101	32			
XX	102	24	Total ..	2,487	1,150
XXI	100	28			
XXII	100	24			

415. The limits of the coupes for the whole rotation period which had been already laid out during the last working plan, will be continued. In Pichavaram felling series, coupe VIII and in Pavunjipatty felling series, Coupe VIII are due for felling in 1956–57, the first year of this working plan.

416. One coupe in each felling series will be offered for felling in each year in these sequence indicated in the tabular statemet of feeling. The couples have not been allotted to definite years. If for any reason, the annual coupes cannot be exploited in full and remain unsold, they may be sold in the following year along with the coupe intended for that year. This does not involve a deviation, but the full reasons for not selling the coupes will be recorded in the control book.

417. *Demarcation and Survey.*—The annual coupe will be demarcated on the ground by 6 feet wide lines, in December of the year prior to that of exploitation. The coupe will be surveyed, plotted and the area computed to the nearest acre. The annual coupe will be divided into two strips in case of Pichavaram felling series and 4, in case of Pavunjupatty felling series. The strip lines will be 6 feet wide. The material obtained from clearing the lines will be handed over to the purchaser of the coupe after recovering the felling charges.

418. *Agency of Exploitation.*—The coupes will be generally sold in public auction, taking each coupe as a separate unit of lease. If a coupe cannot be sold in any year, it will not be worked departmentally on permits or by any other system.

419. The period of lease will depend on the area of the annual coupe, as given below :—

(i) For fuel coupes of area less than 20 acres, 4 months from the date of execution of the agreement.

(ii) For fuel coupes of area more than 20 acres and less than 60 acres-8 months from the date of execution of the agreement.

(iii) For fuel coupes of area more than 60 acres, from the 1st April or the date of execution of the agreement whichever is later up to 31st of March of the following year.

420 *Felling rules.*—(i) Fellings will be done strip by strip. Permission to fell the next strip will be given only after the fellings in the strip have been completed to the satisfaction of the Range Officer.

(ii) Trees marked for retention and seedlings and saplings of valuable species not required by the contractor will be left unfelled.

(iii) The trees shall be cut close to the ground level without severing the bark from the woody portion of the stool. Sharp felling implements shall be used for exploitation.

(iv) The brushwood of the felled trees should not be allowed to remain in the coupe in such a manner as to impede the growth of the coppice shoots from the felled stools.

(v) All fellings in the coupe will be done by the mazdoors of the contractor only and during the fellings, the contractor or his agent will supervise the work.

421. *Coupe arrears.*—In the event of any portion of a coupe remaining unfelled on the termination of a lease, such portion will be re-surveyed and reserved trees re-enumerated as soon as possible after the lease area has been taken over from lessee. The District Forest Officer will put up the arrear area for sale as soon as possible thereafter allowing such voidah as he considers necessary to enable the contractor to fell and remove the produce on it. In case, however, the District Forest Officer is satisfied that the arrear portion contains very poor growth or that it is inexpedient or unremunerative to fell it, he may depart from this rule, and the area may remain unfelled. Full reasons for such a step will be recorded in the Control Book.

422. *Disposal of felled material.*—All small timber which may be felled shall be hammer marked by the beat Forest Guard before its removal from the coupe. All the felled material will be billeted and stacked before its removal from the coupe. The size of the stacks will be 5 feet by 4 feet by $2\frac{1}{2}$ feet = 50 cubic feet. The stacking will not be enforced in case of brushwood which will be permitted to be removed from the coupe on the basis of the permits issued by the contractor or his authorised agent.

Section 5—Subsidiary Regulations.

Cutting thorny growth of other useless tree species.

423. The useless tree species and other thorny growth not required by the contractor need not be cut and they will be allowed to remain as soil cover in the forests. Further, the cutting of thorny growth causes the production of numerous coppice shoots, making the forests infested with more thorny growth than before.

424. *Demarcation of worked coupes.*—After the work in the coupe has been completed the corners of the coupe will be demarcated with stones, which will indicate the coupe number, year of felling and area.

425. *Grazing.*—The felled coupes will be closed to grazing for four years including the year of felling. If cattle-paths exist in the worked coupes, they will be demarcated with a margin on either side about half a chain wide and the path, excluded from the closure. Cutting and removal of grass from the 'closed' coupes may be allowed free of cost.

426. *Fire protection.*—No special fire protection measures are considered necessary to be carried out.

427.—*Statics.*—Statements giving the details of firewood, small timber and brushwood removed from the coupe during the month will be furnished regularly to the Range Officer.

428. *Small timber.*—The coupe contractors will be bound by agreement to supply in the coupe small timber and fuel to the ryots for their bona fide agricultural and domestic requirements at the rates fixed by the District Forest Officer.

Section 6—Control.

429. A control book, a control journal, a record of works, a control map and a deviation statement will be maintained according to the instruction furnished in Appendix XII.

CHAPTER VI—WORKING PLAN FOR THE PROTECTION WORKING CIRCLE.

Section 1—General constitution character of vegetation and area.

General constitution.—This Working Circle comprises the portions of the reserved forests not included in any of the Working Circles, except Minor Forest Produce and Grazing Working Circles. This includes areas that have been kept in reserve for future regeneration operations, areas that are unsuitable for regeneration operations as Kallar, Gravelley, Swampy or steep areas and others.

Character of vegetation.—The various kinds of vegetational types that occur in this Working Circle are already described in Chapter II, Part I.

431. *Area.*—The area included in this Working Circle is 12,439·23 acres. The details of area for each Reserved Forest and Range are given below :—

Name of reserved forest.	*Total area in acres.*	*Area included in this working circle in acres.*
(1)	(2)	(3)
I. Villupuram Range.		
1 Nathamur Reserved Forest—Bit No. 1	4,613·50	91·60
2 Nathamur Reserved Forest—Bit No. 2	3,638·00	815·30
3 Adukkam Reserved Forest	2,395·00	1,290·80
4 Nayanur Reserved Forest	1,543·65	193·20
5 Seedevi Reserved Forest	2,834·90	152·25
6 Athipakkam Reserved Forest	4,266·05	304·40
7 Tachambattu Reserved Forest	2,165·00	22·30
	Total ..	2,869·85
II. Panruti Range.		
1 Kangiruppu Reserved Forest—Bit 1	3,127·10	751·50
2 Kille Reserved Forest	638·00	485·40
3 Pichavaram and Extension Reserved Forest ..	2,717·00	1,534·50
	Total ..	2,771·40

NOTE.—The small areas available in Porto Novo U.R.L. and Ariyakoshti U.R.L. have not been included.

III. Vridhachalam Range.		
1 Semakottai and Extension Reserved Forest ..	6,022·50	204·50
2 Narimanam Reserved Forest	905·90	3·50
3 Velangulam Reserved Forest	1,261·00	1,261·00
	Total ..	1,469·00
IV. Ulundurpet Range.		
1 Varanjaram Reserved Forest	844·80	15·40
2 Kallamedu Reserved Forest	916·75	748·35
3 Kottalamalai Reserved Forest	2,908·00	353·35
4 Thottapadi Reserved Forest	1,518·50	38·00
5 Nangur Reserved Forest	1,716·50	6·00
6 Magarur Reserved Forest	1,199·40	106·40
7 Krishnapuram Reserved Forest	6,001·30	501·30
8 Porasakurichi Reserved Forest	798·20	63·80
9 Kuttakudi Reserved Forest	1,871·50	617·70
10 Alwarmalai Reserved Forest	6,591·20	412·30
	Total ..	2,862·60
V. Tirukoilur Range.		
1 Ravuthanallur Reserved Forest	1,139·80	249·80
2 Kanankadu Reserved Forest	3,750·25	177·20
3 Kadavanur Reserved Forest	4,098·56	111·10
4 Pavanjipatti Reserved Forest	4,313·88	1,826·88
	Total ..	2,364·98

ABSTRACT.

1 Villupuram Range	2,869·85
2 Panruti Range	2,771·40
3 Vriddhachalam Range	1,469·00
4 Ulundurpet Range	2,862·60
5 Tirukoilur Range	2,364·98
Total ..	12,337·83

Section 2—Method of treatment.

432. *General.*—No operations are prescribed for the areas included in this working Circle. If any regeneration operations not contemplated in this worknig plan are to be taken up, the necessary areas suitable for the purpose may be selected from the areas included in this Working Circle.

Section 3—Control.

433. A control journal, control book, record of works, nursery ledger and journal, plantation ledger and journal, record of works and a deviation statement will be maintained for the areas, if any, taken up for regeneration operations as given in Appendix XII. The control records need not be maintained, if no areas are taken up for regeneration operations.

CHAPTER VII—WORKING PLAN FOR THE MINOR FOREST PRODUCE WORKING CIRCLE.

Section 1—General constitution, character of vegetation, area and other details.

434. *Constitution.*—This overlapping Working Circle includes all the Reserved Forests, and unreserved lands under the control of the Forest Department.

435. *Character of vegetation.*—The character of vegetation has been fully described in Chapter II, Part I.

436. *Area.*—This Working Circle extends over the forests of the entire division.

437. *Kinds of produce.*—The details regarding the various kinds of minor forest produce colected are given below :—

Name of produce. (1)	Botanical name of the plant from which collected. (2)	Part of the plant that is collected. (3)
Tamarind	*Tamarindus indica*	fruit.
Mango	*Mangi fera indica*	fruit.
Wood apple	*Ferronia elephantum*	fruit.
Sara pappu	*Buchanania latifolia*	fruit.
Nellikoi	*Phyllanthus emblica*	fruit.
Elandai	*Zizyphus juujuba*	fruit.
Nagai	*Eugenia jambolana*	fruit.
Pungam	*Pongamia glabra*	fruit.
Neem	*Azadirachta indica*	fruit.
Date	*Phoenix sylvestris*	fruit.
Palmyrah	*Borassus flabellifor*	fruit and leaves.
Broom stick grass Honey and Bees wax	*Andropogan species*	Aerial portions.
Cashewnut	*Anacreadium occidentale*	fruit.
Ettikoi	*Strychnos nuxvomica*	fruit.
Kalankoi	*Carrisa carandus*	fruit.
Cocoanut	*Cocos nucifera*	fruit, leaves and fronds.

438. As the forests covered by this working circle are mainly scrub type, the above minor forest products occur only in small quantities.

Section 2—Method of treatment.

439. *Agency of exploitation.*—Each range will be formed into a unit for purposes of sale and collection of minor forest produce except the cocoanut tope in Kille Reserved Forest of Panruti Range. The cocoanut tope in Kille Reserved Forest will be sold as a separate unit. The lease period will be 'fasli' year, i.e., from 1st July to 30th June of the following year. The leases will be sold in February. The existing system of exploitation through contractors will continue. Where there is an exclusive demand for a particular species or a set of species of minor forest produce, the District Forest Officer may sell that as a separate minor forest produce lease, the range being the unit for that species or set of species. These species will be excluded from the general Minor Forest Produce lease for each range.

440. *Rough stone quarries.*—There exist rough stone quarries at various places in each range and fresh quarries will be opened as and when necessary with the permission of the District Forest Officer. The rental charged for quarrying will be decided by the District Forest Officer, according to the orders in vogue at the time.

SECTION 3—SUBSIDIARY SILVICULTURAL REGULATIONS.

Manuring of coconut tape is Kille Reserved Forest.

441. As the coconut is a perennial yielder unless it is regularly mannnured and looked after, it may not yield well. The manures to be applied will depend on the soil in which the coconut tope is situated. As the soil in the Kille coconut tope is mainly sandy, the manurial regime should not only provide the necessary manures for the palms but also provide a body to the soil for the proper retention of the manures. Further, as the tope is young, till it attains the stage of full maturity, the manuring operations will have to be carried on.

442. The coconut tope will be ploughed and two lb. of fish manure and one baskket (about two kerosene tins) of river silt per palm will be applied every third year in December. To start with, the manurial operations will be done in 1956–57 and again in 1959–60, 1962–63 and 1965–66. No other manurial operations are considered necessary.

SECTION 4—OTHER REGULATIONS.

443. *Statistics.*—The contractors shall furnish monthly accounts of minor produce collections made by them to the Range officer concerned.

SECTION 5—CONTROL.

444. *Control.*—A control book and a record of works shall be maintained as given in Appendix XII.

CHAPTER VIII—WORKING PLAN FOR THE GRAZING WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION, CHARACTER OF VEGETATION AND AREA.

445. *Constitution.*—The grazing working circle extends over all the Reserved Forests and unreserved of the division except a few areas which may be closed to grazing for certain specified reasons by the District Forest Officer.

446. *Character of Vegetation.*—The various types of forests met with are described in Chapter II, Part I.

447. *Area.*—This Working Circle extends over the forests of the entire division, except such areas which may be excluded by the District Forest Officer, from time to time.

SECTION 2—METHOD OF TREATMENT.

448. *Regulation of grazing.*—In order to regulate the grazing of cattle in the forests, annual permits will be issued by the Department at nominal values, subject to the conditions then in force. The grazing fees for the various kinds of cattle are given below :—

Buffaloe	50 nP.	per head.
Cow	25 nP.	per head.
Sheep	12 nP.	per head.

449. The above grazing fees are uniform for all the forests in this division. The grazing year will be from 1st July to 30th June of the following year.

SECTION 3—OTHER REGULATIONS.

450. *Areas closed to grazing.*—The areas closed to grazing will be notified annually by the District Forest Officer in the local District Gazette. The following areas will be closed to grazing :—

(i) all Regeneration areas, during the prescribed period of closure experimental areas and similar areas;

(ii) areas which the District Forest Officer may temporarily close as punitive measure for unauthorised burning;

(iii) areas closed for any other valid reasons.

451. *Goats.*—Since most of the forests in this Division are of scrub type, particular care should be taken to keep the goats away from the Reserved Forests. Goats on no account, will be allowed to enter the forests and if found, the owner or grazier will be dealt with in the most severe manner by imposing the maximum allowable fine warranted by the circumstances of the case.

SECTION 4—CONTROL.

452. *Control.*—A control book, a control journal and a record of works will be maintained according to the details furnished in Appendix XII.

CHAPTER IX—ESTABLISHMENT AND LABOUR.

SECTION 1—ESTABLISHMENT.

453. *Executive Staff.*—The present strength of Foresters, Forest Guards and Watchers in the Division is adequate. For carrying out the various regeneration operations, the Foresters and Forest Guards will be employed on the scale indicated, after obtaining the necessary sanction.

454. *Ministerial staff.*—The existing staff is adequate.

STAFF.

SECTION 2—LABOUR.

455. *Availability of labour.*—To start with during the first few years, there may be some difficulty to secure the right type of necessary labour for the various regeneration operations proposed in the Working Plan. But once it is known to the people that the mazdoors will get regular work, that difficulty may disappear. The staggering of the regeneration areas has also been done only with a view to secure adequate labour for the Regeneration Operations. As the Reserved Forests also lie in a scattered manner among the various villages, it is considered that adequate labour for the regeneration operations envisaged in the Working Plan, will be available.

CHAPTER X—MISCELLANEOUS REGULATIONS.

Suggested and prescribed.

SECTION 1—FIRE PROTECTION.

456. Fires are rare in these forests mainly due to the reason that these forests contain semi evergree shrubs like *Memecylon edule, Maba buxifolio, Webera corymbosa* and others with the absence of grass during the hot weather. Hence, no special fire-protection operations are prescribed.

457. In cashew working circle, the areas which are completely cleared off all forest growth become vulnerable to fire due to the presence of grass in hot season. In paragraph 297 to 299 the necessary fire-protection operations have already been prescribed.

SECTION 2—BUILDINGS.

458. There are no departmental buildings in this division except the Range Office building at Tirukoilur. Therefore, almost the entire staff require living accommodation in this division. The necessity for providing residential accommodation for all the staff needs no great emphasis.

459. The details of residential and office accommodation required for the establishment and officers are given below :—

Designation of officer.	Residential.		Office.		Remarks.
	Number and rate.	Total.	Number and rate.	Total.	
(1)	(2)	(3)	(4)	(5)	(6)
District Forest Officer	1 at Rs. 25,000	Rs. 25,000	1 at Rs. 30,000	Rs. 30,000	..
Range Officers	5 at Rs. 12,000 each.	60,000	4 at 10,000 each	Rs. 40,000	There is a Government office building for Tirukoilur Range.
Foresters	21 at Rs. 7,000 each.	Rs. 1,47,000		Nil.	
Forest Guards	37 at Rs. 5,000 each.	Rs. 1,85,000		Nil.	
Total ..		4,17,000	Total ..	70,000	

Thus the total cost comes to be Rs. 4,87,000. The strength of the staff for the above calculation has been taken from Chapter IV, Part I, of this Working Plan.

460. It is suggested that an annual expenditure of Rs. 60,000 from 1958–59 onwards till the end of the Working Plan period may be incurred towards the construction of quarters. It is left to the discretion of the District Forest Officer to fix the priority in the construction of the buildings from year to year.

SECTION 3—ROADS.

461. At present, no roads are maintained by the Department in this Division. As almost all the Reserved Forests are situated in the plains and are connected by the roads maintained by the Highways Department, the necessity for the Department to lay out and maintain them did not arise. But, in view of the large scale regeneration operations that are being taken up during this working plan period, the construction of approach roads to the regeneration areas from the main roads, and inspection roads within and around the plantations become necessary. The District Forest Officer may programme for these roads as and when each regeneration area is taken up.

462. The annual regeneration area being about 7,000 acres, the length of fair-weather roads that will have to be laid out annually may be about 10 miles, on the average. These roads will require annual maintenance also. At the rate of Rs. 1,000 per mile length of road, and Rs. 20,000 for the annual maintenance for the ten years, the total amount required for 10 years will be Rs. 1,20,000. So, the average annual expenditure will be Rs. 12,000.

SECTION 4—MISCELLANEOUS.

463. *Rishivandhiyam Reserved Forest.*—The whole Reserved Forest extending over 3,278 acres has been handed over to the Danish Mission Society for working as fuel coupes for the Leper Asylum situated near the Reserved Forest. A scheme prepared by Sri B. A. Cariappa, the then District Forest Officer, Chingleput, is under scrutiny by the Chief Conservator of Forests. No operations have been prescribed in his Working-Plan for this Reserved Forest.

464. *Manure leaf removal.*—The various concessions afforded by the Government in the removal of green manure leaf by the ryots have been described in paragraph numbers 163 to 166. The manure leaf removal is quite pernicious to the trees as they cannot thrive and grow if they are diverted of their leaves, which manufacture food for them. The forests of our State occur in areas of low rainfall and their recovery from such onslaughts as manure leaf removal is necessarily slow. Repeated hackings for manure leaf will ultimately kill the trees which mean the utter ruination of our forests. So, no prescriptions regarding their removal are being made and it will be governed by the orders issued by the Government from time to time.

SECTION 5—UNRESERVED LANDS.

465 The unreserved lands included in this division are :—

	Acres.
Malattar river bed	3,167·00
Ariyakoshti	129·27
Porto Novo	121·00

466. The efforts of the Department to plant up these areas and the results achieved are given in paragraph Nos. 178 to 183. The Ariyakoshi and Porto Novo unreserves have already been included in the Casuarina Working Circle. So, the question of regeneration of the above unreserved lands will be taken up in 1958–59 and completed soon.

467. In Ariyakoshti and Porto Novo, unreserves, there are certain field survey numbers which he scattered in small patches and are unsuitable for management by the department. It is therefore suggested that the ymay be handed back to the Revenue Department. The details of the survey numbers are given below :—

Ariyakoshti.

Survey numbers.	Area in acres.	Survey number.	Area in acres.
8/3, 7/2 and 8/1	13.42	156/3 and 156/4	3.63
11/3	1.33	322/5	2.03
33/1	1.91	100/1	3.42
138/1	8.69	41/1	1.92
183/1	1.34	167/1	1.07
		130/2 and 194/2	2.97
Total ..	26.69	Total ..	15.04

Porto Novo.

Survey numbers.	Area in acres.	Survey number.	Area in acres.
83/1, 83/2, 83/6 and 83/7	3.98	69/1, 72/4	3.56
81/9, 81/12	1.35	15A/1A	1.27
Total ..	5.33	Total ..	4·83

SECTION 6—BOUNDARY VERIFICATION.

468. The boundaries of the Reserved Forests have not been verified after they reverted back to the Department. The position with regard to the enclosures, rights of ways and other rights and concessions are not known. It is likely that encroachments may also exist in these Reserved Forests. The defects in the Reserved Forest boundaries noted in paragraph 336 of the Working Plan of the Chingleput Forest Division. (1949–50 to 1963–64) by Sri P. Venkataramany have not yet been rectified. So, it is considered necessary that the boundaries should be verified by a special staff and necessary steps taken to remedy the defects noticed. This work will take for 2 sets of suubordinates, each set consisting of one Range Officer and three foresters about two years to complete the work. This verification will be taken up during 1958–59 and 1959–60.

SECTION 7—CONTROL.

469. *Control.*—The maintenance of the following control records, ledgers and journels is prescribed. The details of the skeleton forms are given in Appendix XII. The details of control records to be maintained for each Working Circle are given below :—

Cashew Working Circle—Rehabilitation Working Circle and Casuarina Working Circle.

1 Control book.
2 Plantation journals and ledger.
3 Nursery journal and ledger.
4 Record of works.
5 Control journal.
6 Deviation statement.
7 Control map.

Fuel Working Circle.

1 Control book.
2 Record of works.
3 Control journal.
4 Deviation statement.
5 Control map.

Protection Working Circle, Grazing Circle and Miscellaneous Regulations.

1 Control journal.
2 Record of works.
3 Deviation statement.
4 Control map.

NOTE.—If any regeneration operations are done in the areas included in Protection Working Circle, for such areas, the same control records as those for the Cashew Working Circle, will be maintained as given in paragraph No. 306.

Minor Forest Produce Working Circle.

1 Control book.
2 Control journel.
3 Record of works.
4 Deviation statement.
5 Control map.

470. *Control book.*—The forms prescribed under this are intended for controlling the principal exploitation operations in each working circle. Similar control forms have been devised for the regeneration and cultural operations.

471. *Record of works.*—The various minor operations for which no special forms were prescribed will be entered in this form.

472. *Plantation journal and ledger.*—These will be maintained during the first three years of the plantations or till the time the plantations are established.

473. *Control journal.*—This is the place where the District Forest Officer will record his observations with regard to the Working of the prescriptions in the various Working Circles and offer his suggestions, if any. The information furnished in the other control forms will not be repeated here.

474. *Control map.*—One set of large scale maps (8 inches or 4 inches to 1 mile) will be maintained by correctly posting the details of the areas regenerated under each working circle.

475. *Deviation statement.*—This will be maintained separately for each working circle.

CHAPTER XI—FINANCIAL FORECAST.

SECTION I—REVENUE AND EXPENDITURE.

476. *Revenue and expenditure.*—A forecast of the revenue and expenditure for this division is attempted in this chapter. The final picture that emerges out is one of a favourably disposed surplus. This is mainly due to high price that is obtaining for the cashewnut and the yield that is anticipated from the cashew plantations. Thus, it can be seen that the economics of this division is closely locked up with the yield from the cashew plantations and the ruling market rate for cashewnuts.

477. The annual surplus has been indicated as Rs. 78,025 for this division. In a sense, this does not represent the true position and it is only an average for the working plan period of 10 years, as the cashew plantations will bring in revenue only during the latter half of the working plan period. So, in the first five years the expenditure will be mounting up and during the next five years, the revenue will be rising up.

478. The details of revenue and expnditure are worked out below :—

Details of Revenue and Expenditure.

(*a*) Revenue.

Serial number.	*Details of items.*	*Rate.*	*Amount to the nearest rupee.*	
(1)	(2)	(3)	(4)	
	I. Cashew Working Circle.		RS.	
1	Sale of cashew fruits	Lump sum	45,00,000	
	II Casuarina Working Circle.			
1	Sale of casuarina plantations	98 acres at Rs. 300 per acre.	29,400	
2	Pruning	152 acres at Rs. 2 per acre.	304	
	III. Fuel Working Circle.			
1	Sale of fuel coupes 287·5 at Rs. 60	17,150	1,18,150	
	1,010 at Rs. 100	1,01,000		
		1,18,150		
	IV. Minor Forest Produce Working Circle.			
1	Sale of minor forest produce	At Rs. 315 for 10 years ..	3,150	
	V. Grazing Working Circle.			
1	Sale of grazing permits	At Rs. 13,995 a year for 10 years.	1,39,950	
	Miscellaneous items.			
1	Drift and waifwood	At Rs. 124·9 per year for 10 years.	1,249	1957-58 actuals.
2	Fines and forfeitures	At Rs. 294 per year for 10 years.	2,940	
3	Rents	At 423·3 per year for 10 years.	4,233	
4	Other sources	At Rs. 2,034·6 per year for 10 years.	20,346	
			48,19,722	

(*b*) Expenditure.

Serial number.	*Details of items.*	*Rate.*	*Amount to the nearest rupee.*
(1)	(2)	(3	(4)
	I. Cashew Working Circle.		RS.
1	Raising cashew plantations	15,329 acres at Rs. 50 per acre.	7,66,450
2	Maintenance of special establishment—		
	(*a*) Head mazdoors for 250 acres in 3rd year.	15,329 acres at Rs. 1·44 ..	22,073
	(*b*) Forester for 500 acres for the first two years.	15,329 acres at Rs. 4·80 ..	73,579
	(*c*) One Forest Guard and Watcher for every 500 acres and one forester for every 1,000 acres from the 3rd year onwards.	270 forester units at Rs.1,200	3,24,000

Details of revenue and expenditure—cont.

(*b*) **Expenditure—*cont.***

Serial number. (1)	Details of items. (2)	Rate. (3)	Amount to the nearest rupees. (4)	
	I. Cashew Working Circle—cont.			
3	Plant protection	Lump sum	3,000	
4	Planting of coupe stones	Rs. 300 per year for 10 years.	3,000	
	II. Rehabilitation Working Circle.			
1	Regeneration of dry fuel forests—			
	(*a*) Method 'B'—			
	29,173 acres at Rs. 12 per acre	3,50,076		
	3,323 acres at Rs. 7 per acre	23,261		
		3,73,337	3,73,337	
	(*b*) Method 'C'—			
	10,910 acres at Rs. 48 per acre	5,23,680		
	2,707 acres at Rs. 38 per acre	1,02,866		
	1,389 acres at Rs. 28 per acre	38,892		
		6,65,438	6,65,438	
2	Maintenance of special establishment—			
	(*a*) One forester for 500 acres during the first 3 years.	242 forester units at Rs. 1,200.	2,90,400	
	(*b*) Planting demarcation stones	Rs. 550 per year for 10 years.	5,500	
	III. Casuarina Working Circle.			
	Survey and demarcation of plantations ..	At Rs. 20 per year for 10 years.	200	
	Raising casuarina plantations	292 acres at Rs. 72 per acre.	2,024	
	Pruning operations	292 acres at Re. 1 per acre ..	292	
	Planting demarcation stones	At Rs. 50 per year for 10 years.	500	
	Installation of planter's Rain Guage ..	Lump sum	25	
	IV. Fuel Working Circle.			
	Demarcation and survey of coupes	Lump sum	1,500	
	Planting of coupe stones	Lump sum	1,000	
	V. Minor Forest Produce Working Circle.			
	Manuring cocoanut tope	At Rs. 500 for 4 times ..	2,000	
	VI. Miscellaneous regeneration.			
	Buildings—			
	(*a*) Repairs to old buildings	Lump sum	1,000	
	(*b*) New construction	Lump sum	4,87,000	
	Roads	Lump sum	1,20,000	
	Maintenance of wells	Lump sum	200	
	Verification of boundaries	Rs. 1,200 for two years ..	24,000	
			31,85,518	
	Establishments.			
10	Establishments	At Rs. 76,540-2 for 10 years.	7,65,402	Based on 1957–58 actuals.
			7,65,402	

	RS.
Establishment expenses towards direction for 10 years ..	88,557
Total expenditure (31,85,518 + 7,65,402 + 8 8,557)	40,39,477
Estimated revenue for 10 years	48,19,722
Estimated expenditure for 10 years	40,39,477
Estimated surplus for 10 years	7,80,245
Estimated surplus for one year	78,025

SECTION 2—COST OF THE WORKING PLAN.

479. The cost of preparing this Working Plan is Rs. 16,047 and the details are furnished below:—

Particulars	Amount RS.	nP
1 Conservancy and works ...	782	06
2 Pay of Officers ...	8,820	00
3 Pay of establishment ...	11,769	80
4 Dearness allowance ...	6,444	73
5 Travelling allowance ...	10,151	21
6 Other compensatory allowances ...	2,103	25
7 Contingencies ...	3,672	74
Total ...	43,743	79
Proportionate direction charges ...	20,443	40
Grand total ...	64,187	19

480. The above expenditure was incurred for the preparation of three working plans and three schemes. If the work involved in the preparation of the schemes is considered as equivalent to that of one working plan, the proportional cost of preparation of this working plan comes to be— ... ...

$$\frac{64{,}187/19}{4} = 16{,}046/80 \text{ or } 16{,}047$$

481. The total area of working plan division is 108,654·88 acres and so the cost works out to Re. 0.15 per acre.

CHAPTER XII—SUMMARY OF PRESCRIPTIONS.

A summary of the prescriptions made in Part II is furnished below:

Summary of prescription.

Chapter I—Basis of Proposals.

PARAGRAPH.

1. *Objects of management.*—These were to protect and to rehabilitate the ex-panchayat forests by suitable methods of regeneration of cashew, casuarina and other miscellaneous fuel species, to regulate the supply of small timber, firewood, grazing and other forest products to meet at least partially the needs of the local population and to protect and conserve the water regime of the hill forests ... ... 236 to 238

2. *Measures to secure the objects.*—The details of the various methods adopted have been furnished 239

3. *Working circles.*—Seven Working circles have been constituted. Details of the working circles constituted are given 240

4. *Period of the plan.*—Ten years from the 1st of April 1956 to the 31st of March 1965 241

Chapter II—Working plan for the cashew working circle.

1. *General constitution and character of Vegetation.*—Details of areas constituted and the nature of vegetation found there are furnished ... ... 242 to 243

2. *Planting series.*—Six series covering over an area of 15,329 acres have been constituted ... ... 244 to 245

3. *Special objects.*—These are to plant up the available area during the five years of the Second Five-Year Plan ... ... 246 to 248

4. *Silviculture of cashew.*—Silvicultural details relating to cashew are furnished 249

5. *Silviculture of cashew.*—Clearfelling in strips followed by concentrated artificial regeneration with cashew is the system prescribed ... 249 to 256

6. *Rotation.*—A tentative rotation of 30 years is prescribed ... 257

7. *Yield.*—A forecast of 500 lb. of nuts per acre from the 6th to the 10th yeand and 1,000 lb. from the 11th year has been made ... ... 258 to 260

	PARAGRAPH
8. *Selection of areas.*—Details of suitable areas have been discussed	261 to 263
9. *Table of annual regeneration areas.*—Details are furnished ...	264 to 265
10. *Preparation of sites.*—Division of the regeneration area into 50 acre blocks, clearing 10 feet wide strips at 33 feet intervals from centre to centre and the formation of saucer spots at 16½ feet intervals along the cleared strips in stages before June of the year of regeneration have been prescribed	266 to 268
11. *Planting.*—After the ground is sufficiently moist, dibbling of seeds up to the end of September and beating up of casualties with container plants during North-East monsoon have been prescribed	269 to 270
12. *Seed collection.*—The necessity for proper selection of mother trees and collection of good viable seeds have been stressed	271 to 276
13. *Nursery.*—A nursery of container plants under shade has been prescribed to be raised about a month before the actual planting in the field. Watering regularly has been prescribed	277 to 281
14. *Kumri cultivation.*—If there is demand, areas can be leased out for kumri cultivation	282
15. *Replacing casualties.*—This has been prescribed to be done during the North-East monsoon only	283
16. *Weeding.*—In September and December of the first year and in May, September and December of the second year weeding to keep the saucer spots clean of weeds have bene prescribed. Mulching during the hot season for the first two years has been prescribed. Weeding during the third and fourth years has been left to the discretion of the District Forest Officer	284 to 288
17. *Thinnings.*—During the third year thinnings may be done if considered necessary, by removing the alternate plants on the planted strip	289 to 290
18. *Clearing intervening growth.*—This will be done to the extent necessary, if the growth interferes with the cashew tree	291
19. *Care and maintenance.*—One head mazdoor for 50 acres during the first year and for 100 acres during the second year, will be maintained to supervise the works	292 to 293
In addition, during the first two years one forester for every 500 acres and from the third year onwards one forester for every 1,000 acres and one forest guard and watcher for every 500 acres will be maintained.	
20. *Sale of produce.*—The right to remove cashewnuts has been prescribed to be sold from the sixth year or earlier. Lease units will be 50 acres with six months voidah for removal of produce	294
21. *Pest control.*—The appointment of a Plant Pathologist to control the diseases and pests has been suggested	295 to 296
22. *Fire protection.*—In areas completely cleared of all growth only fire protection by clearing lines all around the blocks and the regeneration areas is prescribed	297 to 299
23. *Soil conservation measures.*—These are prescribed to be done according to the intensity of soil erosion in the area	300
24. *Demarcation.*—Planting of stones bearing the details of the regeneration area is prescribed	301
25. *Grazing.*—Closure to grazing for three years is prescribed.	302
26. *Fencing.*—Raising of a live fence of thorny fuel species all around the regeneration area is prescribed	304
27. *Cost of formation.*—Details of cost of formation per acre are given	305
28. *Control records.*—The maintenance of a control journal, control forms, plantation journal and ledger, nursery journal and ledger record of works and deviation statement is prescribed	306

Chapter III—Working plan for the Rehabilitation Working Circle. ...

PARAGRAPH

1. *Constitution.*—All areas of the ex-panchayat Reserved Forests which are capable of being regenerated are included 307

2. *Area.*—An area of 55,273·2 acres have been distributed under the various regeneration techniques 309

3. *Special objects of management.*—These are to convert the areas included in this Working Circle into fuel-*cum*-small timber forests in as short a time as possible by planting trees and to work them to obtain the maximum net revenue on a sustained yield basis 312

4. *Measures to attain the objects.*—In order to attain the above objects, the areas were classified according to the regeneration techniques to be followed as described below 313

(i) Areas in which adequate number of active tree stumps, trees, pole crop, saplings or established seedlings occur—

(*a*) if the growth is saleable, the area will be regenerated by the Method ' A '; and

(*b*) if the growth is not saleable, the area will be regenerated by Method ' B '.

(ii) Areas other than (i) above will be regenerated by ' Method C '.

5. *Choice of species.*—Fuel species will be used 314

6. *Conversion period.*—A period varying from 10 to 30 years is prescribed 316

7. *Rotation.*—A tentative rotation of 30 years is fixed 317

8. *Seed collection.*—Adequate quantities of seeds are to be collected by the District Forest Officer 320

9. *Nursery.*—Details for raising nursery beds adequate to meet the needs are discussed. Methods of raising nursery beds of *Albizzia lebbek* and *Dalbergia sissoo* have been furnished ... ... 321 to 323

10. *Method ' A '.*—No area has been prescribed in this method of regeneration 324

11. *Method ' B '.*—38,929·4 acres have been prescribed for regeneration in this method by forming seven series 325

12. *Method of regeneration.*—The method of regeneration consisted in the selection of ' blank ', i.e., patches of forest not containing adequate tree growth of valuable species occurring over 25 acres or more in extent, and regenerating them by any one of the regeneration techniques given in Method ' C '. Tending will consist of the removal of creepers and weeds that oppress the planted seedlings during the first two years ... 327 to 329

13. *Cost per acre.*—Details of cost per acre are furnished 330

14. *Method ' C '.*—(1) Kumri Regeneration Technique. No areas have been allotted ... ... 331 and 332

(2) Saucer or sunken mound or trench and mound regeneration technique. 16,343·8 acres have been formed into four series and annual coupes have been allotted ... ... 333 and 334

15. *Method of treatment.*—Annual coupes will be divided into 50-acre blocks and 6 feet wide strips will be cleared at 33 feet apart from centre to centre during the North-East monsoon of the year previous to that of regeneration and the area regenerated by any one of the following methods 335

(*a*) *Saucer Regeneration Technique.*—Saucers of radius 3 feet will be dug at 22 feet apart along the 6 feet wide cleared strips with a pit 1 foot by 1 foot by 1 foot size at the centre and with an inward slant to the central pit. After the weathering of the soil in the following hot season. the pits will be filed up in June of the year of plantation ... ... 336 and 337

(*b*) *Sunken mound technique.*—Along the 6 feet wide cleaned strips, trenches of size 6 feet by 1 foot by 1 foot will be dug at 22 feet intervals and the soil allowed to weather. Before June of the year of planting, mounds of size 4 feet bottom length, 2 feet top length and 15 inches height will be formed with the weathered soil in the middle of the trench leaving one foot on either side as water traps 338

PARAGRAPH

(c) *Trench and mound technique.*—As on the sunken mound technique, trenches are dug in this method also. In this case, mounds are formed on the low hill side of the trench and on already pick-axed earth with the weathered soil, leaving a berm of six inches between the trench and the mound 339

16. *Sowing and planting.*—Container plants will be used as far as possible for saucer and sunken mound techniques. Sowings or transplanting of nursery seedlings will be used only when container plants are not available. Dibbling of seeds or container plants will be used for the trench and mound technique. These will be done during the South-West or North-East monsoon after sufficient rains 340

17. *Weeding and tending.*—Before the beginning of the hot season, the number of plants per regenration spot will be reduced to a few in case of sowings. Soil working and weeding will be done during September, December and January–February, in the first year, during June–July, September and January in the second year, and in September and January in the third year. Hot weather mulching will be done during the first two years during the last soil working. Casualties will be replaced during the second year ... ... 341 to 345

18. *Estimate of costs.*—Details are given. 347

19. *Hill top and bouldery areas technique.*—No regeneration operations have been prescribed under this method 348

20. *Thinnings.*—No thinnings are prescribed 351

21. *Care and maintenance.*—During the first year, one head mazdoor for 50 acres and during the second and third years, one head mazdoor for every 100 acres will be maintained. During the first three years, one Forester will be in charge of every 500 acres of regeneration area . 352 to 354

22. *Old plantations.*—No cultural or tending operations will be done in the older plantations 355

23. *Fencing.*—Till barbed wire is made available live fence will be grown along the periphery of the regeneration areas by working soil to a depth of 9 inches and width of 3 feet and sowing seeds of thorny fuel species 356

24. *Grazing.*—Regeneration areas will be closed to grazing for five years. Staggering of the regeneration areas to avoid contiguous blocks of closed coupes in the manner given will be done 357

25. *Demarcation.*—Planting of demarcation stones at prominent places in the regeneration area is prescribed 358

26. *Control.*—Maintenance of a control journal, control forms, plantation journal and ledger nursery journal and ledger, record of works and deviation statement is prescribed 359

Chapter IV—Working Plan for the Casuarina Working Circle.

1. *Constitution.*—Old casuarina plantation and other suitable areas have been included 360

2. *Area.*—Two hundred and sixty-two acres have been constituted into one planting series ... ... 362 to 363

3. *Special objects of management.*—These are to meet the firewood needs partly at least of towns, to ensure maximum net revenue available and to attain the normal forest 364

4. *Measures to attain them.*—Suitable areas are to be worked on the shortest rotation 365

5. *Silvicultural system.*—Clear felling with concentrated artificial regenration of casuarina will be the system followed 367

6. *Rotation.*—After discussing the deatils of the data collected, a rotation of nine years has been fixed 368

7. *Determination of the annual cut.*—The details for an annual regeneration area of about 65 acres have been worked out 369

PARAGRAPH

8. *Table of annual fellings.*—Details are furnished 375

9. *Felling and extraction.*—Sale of the annual coupes is prescribed. Cutting and billeting have also been prescribed ... ... 376 to 377

10. *Clearing.*—Levelling of the clear felled coupe after exploitation is prescribed 379

11. *Yield.*—A yield of 20 tons per acre has been worked out 380

12. *Aligning, staking and pitting.*—Pits of size 1 foot by 1 foot by 1 foot at 8½ feet espacement will be dry after alignment 381

13. *Seed collection.*—Necessary quantity of seeds will be collected and stored properly 382

14. *Nursery practice.*—Raising of nursery beds of standard size using four ounces of seeds per bed and proper manure is prescribed. Each bed will produce 3,000 seedlings of size 1½ feet to 2 feet ... ... 383 to 384

15. *Fencing.*—Barbed wire or locally available material will be used. 385

16. *Wells.*—One per 3 acres of plantation will be dug 386

17. *Planting.*—Casuarina seedlings will be planted in June–July without bending the roots 387

18. *Watering.*—Each plant will get about half a gallon of water every time. Watering regime will be as follows:— 388

(*a*) First year—

(i) first 10 days—twice a day.
(ii) next 10 days—Every alternate evening.
(iii) till the end of first year—twice a week or more often if from found necesary. No watering will be done on rainy days.

(*b*) *Second year.*—Watering will be done to the plants that need it. From the third year, no watering will be done. If the District Forest Office finds if necessary, it may be done.

Seedlings with top leader broken will be replaced by another plant.

19. *Weeding*—(*a*) *First year.*—Scrapping in September and January to a radius of 18 inches and hot weather mulching in February will be done. 389

(*b*) *Second year.*—In July and December scrapping to a radius of 18 inches will be done. Weedings during the third and subsequent years will be done if found necessary.

20. *Replacement of casualties.*—Casualties will be beaten up during the first year as and when it occurs. Big size seedlings only will be used. 390

21. *Pruning.*—In the fourth year, all plants above 3 feet height will be pruned to one-third its height up to 8 feet with a sharp knife. The branches will be cut one inch away from the stem ... ... 391 to 392

22. *Thinning.*—No thinning will be done 393

23. *Demarcation stones.*—Plantations will be demarcated by corner stones bearing details of area and year of formation 394

24. *Grazing.*—Plantations will be closed to grazing for three years. 395

25. *Experiments.*—*Raising of Eucalyptus hybrid* plantations over one acre every year for five years with nursery raised six months old container plants on an experimental basis is prescribed. If found successful, it will be extended to large areas ... ... 396 to 397

26. *Fungus.*—Extraction of all dead and dying trees and working of the soil at the end of the rotation are prescribed to reduce fungus incidence 398

SECTION 5—OTHER REGULATION.

27. *Rain gauges.*—Installation of Rain gauges in the first year's regeneration area is prescribed to record the rainfall and to keep watch over watering operations 399

28. *Statistics.*—Maintenance of details of yield and revenue is prescribed 400

29. *Cost of formation.*—Details are furnished 401

Chapter V—Working plan for the fuel working circle.

PARAGRAPH

1. *Constitution.*—Plains areas with good growth have been included in this Working Circle 403

2. *Area.*—Four thousand six hundred and eighty-three have been formed into two fuel felling series, viz., Pichavaram Felling series and Pavanjipatty Felling Series 405

3. *Silvicultural system.*—In Pavunjipatty Felling series, simple coppice system will be followed. In Pichavaram Felling Series, uniform system will be followed. Here fifteen mother trees will be left as standards. No definite areas have been allotted to the periodic blocks except that of P.B. I. ... ... 409 to 410

4. *Felling cycle.*—Thirty-five years for the Pavunjipatty Felling Series and forty for the Pichavaram Felling series will be followed ... 411

5. *Yield.*—Yield will be regulated by area. Anticipated yield per acre is given 412–413

6. *Allotment of coupes.*—Annual coupes have been allotted in both the series 414

7. *Demarcation.*—Coupes will be demarcated by cutting 6 feet wide lines 417

8. *Method of working.*—One coupe in each series will be taken up for working every year. The unsold coupes will be sold along with the next year's coupes. The period of lease will depend on the area of the coupe, varying from four months to one year ... ... 481 to 419

9. *Felling rules.*—Coupes will be exploited strip after strip, leaving the standards and mother trees. Sharp implements should be used to cut the trees to the ground without severing the bark. Only mazdoors authorized by the purchaser will be allowed to work in the coupes ... 420

10. *Coupe arrears.*—The unfelled coupe will be freshly demarcated and sold again in open auction if the growth is unsaleable, the District Forest Officer may not sell it 421

11. *Felled material.*—Felled material will be formed into stacks of size 5 feet by 4 feet by 2½ feet is equal to 50 cubic feet and then moved. 422

12. *Cutting thorny growth.*—The thorny growth and the useless species need not be cut by the purchaser 423

13. *Demarcation of worked coupes.*—Worked coupes will be demarcated by planting coupe stones at prominent places 424

14. *Grazing.*—Felled coupes will be closed to grazing for four years. Cutting and removal of grass will be permitted 425

15. *Statistics.*—Details regarding yield and revenue will be collected by the Range Officer 427

16. *Small timber.*—The purchasers will supply small timber to ryots for their bona fide use at fixed rates 428

17. *Control.*—Maintenance of control records is prescribed 429

Chapter VI—Working plan for the protection working circle.

1. *Constitution.*—Areas not included in any other working circle except overlapping working circles are included 430

2. *Area.*—An area of 12,439·23 acres is included 431

3. *General.*—These areas will be kept as reserves for future regeneration works 432

4. *Control.*—Maintenance of control records is prescribed for all areas taken up for regeneration 433

Chapter VII—Working plan for the minor forest produce working circle.

1. *Constitution and area.*—The entire area of the division is included. 434

2. *Kinds of produce.*—The various minor forest products available in the division are described 437

3. *Exploitation.*—Sale of minor forest produce with Range as unit except palmyrah leaves of Chunampet ex-zamin area which will be a separate lease is prescribed 439

4. *Rough stone quarries.*—Whenever there is demand these will be opened by the District Forest Officer at the appropriate place 440

PARAGRAPH

5. *Manuring of coconut tope in Kille Reserved Forest.*—Ploughing of cocoanut tope and application of 2 lb. of fish manure and one basket (two kerosene tin) of river silt per every third year in December is prescribed ... ... 441 to 442

6. *Control.*—Maintenance of control records is prescribed 444

Chapter VIII—Working plan for the grazing working circle.

1. *Constitution and area.*—The entire area of the division is included, being an overlapping working circle ... ... 445 to 447

2. *Regulation of grazing.*—Details about the sale of grazing permits are furnished ... ... 448 to 449

3. *Clossed areas.*—Various areas closed to grazing area described 450

4. *Goats.*—Goats are prohibited to enter the forests limits 451

5. *Control.*—Maintenance of control records is prescribed 452

Chapter IX—Establishment and labour.

1. *Establishment.*—The existing executive and ministerial staff are considered adequate ... ... 453 to 454

2. *Labour.*—By staggering the regeneration operations at the proper season, the labour scarcity if arises will diminish 455

Chapter X—Miscellaneous regulations (suggested and prescribed).

1. *Fire protection.*—Since the undergrowth is of evergreen nature, no special fire protection operation except in cashew working circle are required ... ... 456 to 457

2. *Buildings.*—Maintenance of the existing buildings and a programme for construction of new building has been sugegsted ... ... 458 to 460

3. *Roads.*—Maintenance of roads to the various plantation has been prescribed ... ... 461 to 462

4. *Rishivandhiyam Reserved Forest.*—This Reserved Forest has been handed over to the Danish Mission Society to give employment for the lepers and a scheme for working this forest is under scrutiny by the Chief Conservator of Forests 463

5. *Manure leaf removal.*—This will be governed by the orders issued from time to time 464

6. *Unreserved lands.*—The handing over of certain patta numbers of small areas in the Porto Novo and Ariyakoshti unreserved lands has been suggested 467

7. *Boundary verification.*—Employment of special staff to check the limits of the boundaries for two years has been prescribed 468

8. *Control.*—Details regarding the maintenance of the various annual records have been given ... ... 469 to 475

Chapter XI—Financial Forecast.

1. *Revenue and expenditure.*—Details of Revenue and expenditure for the working plan period has been furnished. The anticipated annual surplus comes to be Rs. 78,025 478

2. *Cost of the Working Plan.*—The details of the cost of the working plan are given. The cost of preparation of the Working Plan comes to be Re. 0-15 nP. per acre ... ... 479 to 480

Chapter XII—Summary of Prescriptions.

1. *Summary of prescriptions.*—A summary of the prescriptions given in **Part II the Working Plan is given.**

APPENDIX I·

List of trees, shrubs, herbs and other—Vide paragraph .

Botanical name. (1)	*Tamil name.* (2)
Abrus precatorius	Kundumani.
Acacia arabica	Karuvelam.
Acacia ferruginea	Parambai.
Acacia intsia	Indu.
Acacia latronum	Anaimullu, Kakkodai.
Acacia leucophloea	Velvelam, Sarai.
Acacia sundra	Karungali.
Acanthus illicifolius	......
Adina cardifolia	Manjakadambai.
Aegiceras majus	Narikandan.
Aegle marmelos	Vilvamaram.
Agave americana	Kathalai.
Alangium lamarckii	Alingi.
Albizzia lebleck	Vagai.
Albizzia odoratissima	Karuvagai.
Anacardium occidentale	Munthri.
Anogeissus latifolia	Namai.
Anona squamosa	Seethapalam.
Arthrochinimum species	......
Asparagus reacemosus	Thanuttukodi.
Atlantia monophylla	Kattu elimicha.
Avicennia offia-nalis	Venkandan.
Azadirachta indica	Veppam.
Azima tetracantha	......
Balsamodendron berrei	Mulkiluvai.
Bambusa arundinacea	Perumungil.
Bassia latifolia	Illuppai maram.
Bauhinia malabarica	Vellathi.
Bauhiniapurpurea	Mandarai.
Bauhinia racemosa	Athi.
Bombax malabaricum	Elavamaram or Ilavu.
Borassus flabellifer	Panamaram.
Bridelia retusa	Mulvengai.
Bruguira cylindricopsis	Pannikuttikazhi.
Buchanania latifolia	Saraiparuppu.
Butea frondosa	Elaiparasu.
Ca-lotropis gigantea	Erukku.
Canthimum didymum	Nekkini.
Canthimum parviflorum	......
Capparis sepiaria	Kattu kathiri.
Carallia integerimma	......
Carissa spinarum	Sirukila.
Cassia auriculata	Avaram.
Cassia fistula	Konnai.
Cassia siamea	Ponavarai.
Cassia montana	Melai avaram.
Casuarina equisetifolia	Savukku.
Ceriops roxburghiana	......
Chloroxylon swietenia	Porasu.
Cleistanthus collinus	Oduvan, Odugu.
Cocos nucefera	Thennaimaram.
Crataeva religiosa	......
Crotolaria vergosa	......
Cynometra ramiflora	......
Dalbergia lanceolaria	Patchalai.
Dalbergia paniculata	Porapatchalai.
Daemia extensa	......
Derris uliginosa	......
Dichrostachys cinerea	Vadathalai.
Dodonia viscosa	Virali.
Elacodendion glancum	Kanniramaram.
Erythrina indica	Muruku.
Erythrina suberosa	Mylmurukku.

Botanical name. (1)	*Tamil name.* (2)
Erythroxylon monogynum	Sembulichan.
Eugenia jambolana	Naga.
Euphorbia antiquorum	Kalli.
Euphorbia tirucalli	Tirucalli.
Excoecaria agallocha	Thillai.
Feronia elephantum	Vilamaram.
Ficus begalancis	Ala.
Ficus glomerata	Athimaram.
Ficus religiosa	Arasu.
Fimbrystylis species	......
Flacourtia ramontchi	Kothuvela
Flacourtia sepiaria	Sothukala.
Fluggea leucopyrus	Vepula.
Gardenia latifolia	Kambil.
Gardenia turgida	......
Gme-lina asiatica	......
Gymnosporia montana	Kattangi.
Gyrocarpus americanus	Thanaku.
Hardwickia binata	Achamarram.
Hemidesmus indicus	Nannari.
Holarrhena antidysenterica	Eukkalaipala-i, or Karupalai.
Hugohia mystax	......
Ixora parviflora	Sulundu.
Jatropha curcas	Kattamankku.
Lora-nthus longiflorus	Pulluruvi.
Leucas aspera	Thumbai.
Lumnitzera recemosa	....
Maba buxifolia	Irumbali.
Mangifera indica	Mamaram.
Memecylon edule	Kasan.
Mimusops hexandra	Palai maram.
Morinda tinctoria	Nona.
Murraya exotica	Kattu karaiveppilai.
Murraya konigii	Kariveppilai.
Ochrocarpus longifloius	....
Odina wodier	Odiya maram.
Opuntia dellenii	Nagatalai.
Pandanus odaratissimus	Thazhai.
Peltophorum ferrugineum	Iyalvagai.
Phoenix humilis	Siru icha.
Phoenix sylvestris	Ichamaram.
Phyllanthus emblica	Nelli.
Pithecolobium dulce	Kodukapulimaram.
Pithecolobium saman	Thoongumoonjimaram.
Poinciana elata	Vadamudukki.
Pongamia glabra	Pungam.
Pterocarpus marsupium	Vengai.
Pterolobium indicum	Karu indu, Indu.
Randia dumetorum	Karai.
Rhizophora mucronata	....
Salicarnia species	Sorapinna.
Salvadora pers-ica	Sorapinnai or Karim kandam.
Santalum album	Chandnam.
Sapindus emarginatus	Boonthikottai.
Scutia indica	Kokkimullu.
Sesuvium portulacastrum	....
Solanum tribolatum	Thuthuvelam.
Sonneratia apetala	Mara a.
Streblus asper	....
Stray-chnos nuxvomica	Etti.
Strychnos potatorum	Thethankottai.
Sueda fruiticosa	Umri.
Sueda maritima	Umri.
Tamarindus indica	Pulia maram.
Tectona grandis	Thekku.
Terminalia arjuna	Vellamaruthu, Nirmaddi
Terminalia bellerica	Thani.
Thespesia populnea	Puvarasu.
Toddalia aculeata	Kattu milagu.
Vitex altissima	....
Vitex negundo	Nochi
Vitis quadrangularis	Puranai.

Botanical name. (1)	*Tamil name.* (2)
Webera corymbosa	Tharani.
Wrightia tincotria	Palai.
Wrightia tomentosa	Veppala.
Zizyphus jujuba	Yelandai.
Ziziphus oenoplia	Churaimullu.
Ziziphus xylopyrus	Kottai yellandai.

APPENDIX II.

Rain fall data of important stations (vide paragraph 19).

Panruti.

(1)	1947. (2)	1948. (3)	1949. (4)	1950. (5)	1951. (6)	1952. (7)	1953. (8)	1954. (9)	1955. (10)	1956. (11)	Average. (12)
January	5·35	4·09	..	0·12	0·15	0·65	3·39	2·59	2·16	0·16	..
February	..	1·40	..	0·81	..	1·10	0·10	0·10	..	..	..
March	0·58	..	..	..	..	0·29	..	2·94	..	..	..
April	0·18	1·13	..	..	1·00	..	1·26	1·10	4·84	0·80	..
May	0·92	0·71	3·06	2·81	2·31	1·00	0·49	..	17·41	1·68	..
June	1·51	1·27	5·60	1·01	0·71	1·12	3·60	0·19	1·59	6·63	..
July	5·68	8·64	2·87	1·92	2·98	1·58	3·74	7·46	3·61	1·32	..
August	5·69	5·14	7·86	7·44	6·64	5·81	4·37	3·59	5·82	8·98	..
September	5·82	6·25	1·93	2·68	0·87	..	7·53	2·60	6·85	6·04	..
October	8·68	5·17	1·36	6·36	2·19	6·20	3·63	15·56	5·20	9·36	..
November	2·07	13·50	2·48	3·27	15·85	..	4·60	0·18	2·70	9·72	..
December	0·13	5·84	..	4·33	..	8·72	0·84	5·64	7·68	3·54	..
Total ..	36·61	53·14	25·16	30·75	32·70	26·47	33·55	41·95	57·86	48·13	38·63

Cuddalore.

(1)	1947. (2)	1948. (3)	1949. (4)	1950. (5)	1951. (6)	1952. (7)	1953. (8)	1954. (9)	1955. (10)	1956. (11)	Average. (12)
January	8·05	3·36	..	..	0·97	0·81	1·41	5·21	1·92	0·66	..
February	2·23	..	..	0·58	..	1·65	..	0·85	..	0·02	..
March	0·55	..	..	..	..	..	..	7·03	..	..	..
April	0·43	..	0·08	..	1·11	..	1·82	1·08	3·60	1·26	..
May	0·81	0·19	4·18	3·96	..	1·05	..	0·16	15·31	0·34	..
June	0·87	1·03	4·16	1·20	2·54	0·98	3·26	0·71	1·26	5·57	..
July	4·64	2·76	7·69	2·09	1·42	2·40	1·46	4·21	5·25	1·44	..
August	4·80	4·68	4·01	2·71	7·64	6·07	5·55	5·76	6·48	5·26	..
September	9·55	8·11	1·01	2·95	1·17	0·67	6·40	2·58	1·11	6·15	..
October	9·02	4·55	1·95	4·65	1·70	8·07	14·53	18·42	3·76	11·78	..
November	2·83	15·33	4·24	8·45	36·41	0·85	4·38	1·03	3·80	17·65	..
December	0·70	2·57	0·26	5·46	0·18	11·82	2·77	9·56	10·06	5·65	..
Total ..	44·48	42·58	27·58	32·05	53·14	34·37	41·59	56·60	55·55	55·78	44·37

Kurinjipadi.

	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	Average
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
January	7·30	7·18	—	—	1·05	0·87	—	3·70	1·34	0·50	..
February	1·19	—	—	4·05	—	3·87	—	—	—	—	—
March	0·74	—	—	—	—	0·01	—	6·20	—	—	..
April	0·19	—	..	—	3·03	—	2·58	0·11	2·35	1·56	..
May	0·44	0·65	0·77	3·52	1·52	0·64	..	0·40	9·35	0·68	..
June	1·51	0·95	6·57	2·61	1·16	0·49	1·65	0·89	0·55	6·38	..
July	4·74	3·65	3·82	1·87	4·97	2·37	1·38	3·26	6·48	2·58	..
August	5·19	1·22	5·23	4·05	6·97	5·36	3·00	2·47	2·18	7·05	..
September	11·17	5·05	6·27	3·79	2·92	0·20	7·62	2·37	5·44	10·88	..
October	12·58	5·49	5·76	6·42	3·07	4·84	9·04	17·60	6·37	10·20	..
November	4·14	14·39	2·56	5·00	19·66	..	4·07	2·51	3·85	10·73	..
December	1·43	2·04	..	9·52	0·01	18·90	1·20	7·98	8·99	2·81	..
Total ..	50·62	40·62	29·98	40·83	44·36	37·55	30·54	47·49	46·90	53·37	42·22

Porto Novo.

	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	Average.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
January	10·52	7·08	..	0·59	0·40	2·11	1·72	8·20	0·81	2·02	..
February	0·91	..	..	0·51	..	1·05	..	0·30	..	..	..
March	0·29	0·24	..	..	0·99	..	..	6·15	..	..	..
April	1·16	..	0·58	..	1·62	..	1·40	0·86	2·80	3·16	..
May	0·24	..	0·79	2·77	1·17	0·87	..	0·33	10·38	0·64	..
June	0·35	0·80	4·26	1·91	0·71	0·49	0·87	0·45	..	8·29	..
July	2·74	1·25	8·33	2·31	1·74	1·67	0·44	2·38	1·99	1·40	..
August	4·11	3·10	4·31	3·93	5·59	6·41	1·72	4·00	6·54	8·21	..
September	9·82	3·55	2·53	7·81	3·98	0·72	13·38	2·07	2·30	14·75	..
October	5·49	6·98	1·72	4·69	6·64	3·89	7·85	25·88	4·81	9·08	..
November	4·03	12·33	4·13	9·87	28·11	2·47	6·30	3·48	6·43	11·04	..
December	1·53	5·38	..	9·65	1·28	13·19	3·97	9·09	10·04	3·52	
Total ..	41·31	40·71	25·65	44·04	52·73	33·17	37·65	57·19	46·10	62·10	44·16

Chidambaram.

(1)	1947. (2)	1948. (3)	1949. (4)	1950. (5)	1951. (6)	1952. (7)	1953. (8)	1954. (9)	1955. (10)	1956. (11)	Average. (12)
January	8·87	6·63	0·38	0·23	0·83	1·94	2·57	8·14	0·72	0·74	..
February	0·43	..	..	3·19	..	1·09	0·33	0·18	0·63	0·09	..
March	1·71	..	..	..	0·50	..	..	9·37	..	..	..
April	0·57	0·36	..	..	1·65	0·49	1·70	1·03	3·17	1·88	..
May	..	0·42	0·97	4·08	2·24	0·94	..	0·34	11·15	0·11	..
June	2·78	1·12	6·88	3·43	1·58	1·09	1·95	..	..	7·87	..
July	4·18	2·82	7·88	1·96	1·33	2·26	1·58	3·16	4·63	1·14	..
August	5·46	4·23	2·27	5·44	11·28	2·62	1·07	4·39	4·63	4·97	..
September	6·13	2·80	4·54	7·62	1·80	0·46	5·93	1·43	2·67	9·99	..
October	9·12	3·82	2·05	4·45	3·42	6·81	7·91	20·02	4·98	11·37	..
November	4·20	13·48	6·29	11·23	20·98	2·79	6·80	2·00	4·61	13·09	..
December	0·22	4·05	0·25	11·06	1·89	8·51	2·82	9·04	17·79	4·73	..
Total ..	43·67	39·73	31·51	52·59	47·50	29·00	32·66	59·10	49·87	55·98	44·16

Vridhachalam.

(1)	1947. (2)	1948. (3)	1949. (4)	1950. (5)	1951. (6)	1952. (7)	1953. (8)	1954. (9)	1955. (10)	1956. (11)	Average. (12)
January	3·78	2·32	..	..	0·31	0·47	1·39	1·74	0·46	1·88	..
February	..	1·16	..	1·92	..	2·47	..	..	..	..	..
March	0·80	..	..	0·29	0·12	0·47	..	2·32	..	..	..
April	0·66	1·11	0·42	..	2·11	0·24	0·37	1·07	1·98	0·95	..
May	0·28	1·59	2·09	2·07	3·67	3·32	0·78	9·05	14·17	4·33	..
June	0·64	1·55	3·79	2·71	0·62	0·51	1·88	1·06	0·33	6·33	..
July	4·51	3·86	2·65	1·56	3·63	3·52	5·83	5·37	3·27	0·80	..
August	5·67	1·56	5·71	7·45	9·40	5·17	2·87	11·41	3·51	7·53	..
September	5·10	4·80	2·48	5·30	1·87	..	8·50	1·79	4·50	8·72	..
October	7·17	3·44	1·70	3·84	3·62	3·53	15·39	19·36	6·50	10·29	..
November	1·28	14·52	3·11	4·01	9·70	..	4·07	..	5·49	9·90	..
December	2·62	1·47	..	3·61	..	6·60	..	4·44	9·11	1·66	..
Total ..	32·51	37·38	22·95	32·76	35·10	23·30	41·05	57·61	49·32	52·39	38·44

Kallakurichi.

	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	Average.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
January	2·69	4·14	..	0·07	..	0·33	0·42	2·06	1·35	1·44	..
February	0·04	1·02	..	2·40	..	2·11	1·67	..	..	..	..
March	2·29	0·03	..	3·79	0·23	0·14	..	1·77	0·17	..	..
April	1·52	..	0·43	..	2·50	1·16	1·40	0·59	1·67	0·63	..
May	1·04	2·46	1·55	3·37	1·87	2·26	3·47	0·15	11·09	1·02	..
June	1·06	3·76	2·35	1·07	0·76	0·69	2·68	1·46	0·95	7·86	..
July	4·21	1·36	2·63	2·83	5·11	2·56	3·73	6·76	6·09	1·84	..
August	5·21	1·20	7·76	3·02	10·56	8·41	2·72	4·48	5·78	4·93	..
September	4·15	4·43	4·66	4·89	2·04	1·71	9·44	1·30	4·72	12·80	..
October	11·99	4·83	2·39	0·90	0·63	3·70	9·70	12·33	3·72	11·07	..
November	0·95	13·90	4·50	2·58	8·82	0·04	1·17	..	2·38	10·30	..
December	0·02	2·81	..	1·20	..	12·56	0·55	5·14	6·33	2·43	..
Total ..	35·17	39·96	26·27	26·12	32·52	35·67	36·95	36·04	44·25	54·32	36·73

Ulundurpet.

	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	Average.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
January	3·01	1·00	..	0·26	0·11	0·51	0·90	2·12	1·07	0·14	..
February	..	0·46	..	2·25	..	0·61	..	..	..	..	..
March	0·51	..	..	0·30	0·06	0·24	..	2·22	..	..	..
April	1·00	1·04	0·71	..	1·27	..	0·65	0·59	1·13	0·08	..
May	1·80	2·30	1·75	3·01	1·52	1·04	2·03	1·76	13·66	2·64	..
June	1·10	0·82	2·76	1·59	1·85	2·64	1·54	1·37	1·22	5·46	..
July	5·26	3·96	4·05	1·01	5·28	2·42	3·10	4·40	5·65	1·10	..
August	5·18	1·02	8·24	4·27	8·27	6·36	3·09	4·25	2·45	5·96	..
September	3·97	2·88	4·79	4·67	0·97	0·07	11·44	2·97	4·23	6·95	..
October	5·02	1·54	1·54	6·22	3·56	5·00	10·17	17·54	2·62	9·10	..
November	0·91	15·73	2·17	2·95	9·48	..	2·64	..	2·90	7·30	..
December	0·40	1·86	..	3·53	0·14	8·89	0·50	5·09	6·87	2·28	..
Total ..	28·16	32·61	26·01	30·06	32·51	27·78	36·06	42·31	41·82	41·91	33·92

Tirukoyilur.

	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	Average.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
January	1·68	1·76	..	0·38	..	0·22	0·76	2·61	0·67	1·01	..
February	..	..	..	1·30	..	1·12	..	..	..	..	..
March	0·50	..	..	0·27	0·90	..	..	2·12	0·06	..	..
April	1·43	..	..	0·10	1·96	0·52	1·98	0·37	1·23	1·91	..
May	1·70	0·85	1·89	2·00	6·25	2·62	0·77	1·52	11·49	2·69	(Sixty-nine)
June	3·51	0·67	4·54	0·88	0·14	0·77	3·79	1·17	0·95	3·88	..
July	9·64	4·32	5·29	2·24	2·84	0·82	1·88	5·06	9·61	1·13	..
August	5·61	2·0[illegible]	11·73	3·52	10·24	4·18	11·40	9·64	5·46	4·09	
September	10·15	5·14	4·42	5·54	2·77	..	6·60	1·01	4·54	11·00	..
October	6·96	3·17	5·20	5·06	5·62	3·71	11·37	11·26	7·56	9·56	..
November	0·64	9·34	3·39	2·54	8·90	0·29	1·97	0·47	3·42	11·15	..
December	0·15	1·14	..	1·75	..	15·29	0·67	2·99	3·80	3·07	..
Total	41·97	28·42	36·46	25·58	39·62	29·54	41·19	38·22	48·79	49·49	37·93

Sankarapuram.

	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	Average.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
January	..	..	..	..	..	..	..	..	0·79	1·22	..
February	..	..	..	..	..	..	..	..	..	..	..
March	..	..	..	..	..	..	..	..	0·10	..	..
April	..	..	..	..	..	..	..	..	3·31	0·29	..
May	..	..	..	..	..	..	..	..	6·52	2·34	..
June			Rainfall station not in existence.						0·23	3·40	..
July	..	..	..	..	..	..	..	..	8·29	0·32	..
August	..	..	..	..	..	..	..	..	2·04	4·08	..
September	..	..	..	..	..	..	..	..	5·61	11·03	..
October	..	..	..	..	..	..	..	..	5·95	6·19	..
November	..	..	..	..	..	..	..	..	3·53	10·16	..
December	..	..	..	..	..	..	..	2·83	2·83	5·20	..
Total	..	..	..	..	..	..	..	2·83	41·57	41·83	41·70

Villupuram.

..	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	Average.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
January	3·14	2·26	..	..	..	0·37	2·07	2·44	1·96	..	..
February	..	1·36	..	0·10	..	1·99	0·16	..	..	..	..
March	0·65	0·34	..	..	0·4	..	..	3·67	..	..	..
April	1·20	..	0·18	..	2·46	..	1·60	0·55	2·04	1·10	..
May	1·60	0·65	1·66	24·3	3·48	1·34	0·76	..	..	0·34	..
June	4·16	2·15	3·16	0·72	0·65	1·39	6·54	1·06	0·91	7·42	..
July	7·89	5·66	5·06	3·31	1·21	1·89	2·14	5·99	7·85	3·18	..
August	5·72	1·48	6·81	4·08	8·70	5·52	8·97	5·87	4·09	7·10	..
September	7·79	3·66	4·35	4·99	2·33	..	7·59	0·43	6·10	13·01	..
October	4·54	4·15	1·58	8·70	7·15	3·99	2·82	17·08	5·95	12·92	
November	1·19	14·44	3·72	4·57	8·00	0·89	2·84	..	6·70	9·63	..
December	0·15	3·41	..	1·54	..	17·06	0·87	4·84	5·62	2·22	..
Total ..	38·03	40·55	26·52	30·44	34·02	34·44	36·36	41·93	41·22	56·92	38·04

APPENDIX III.

List of beat charges (Vide *paragraph* 36).

Serial number and name of range.	*Serial number and name of beat.*	*Area in acres.*	*Name of reserved forest.*
(1)	(2)	(3)	(4)
1 Villupuram	1 Attipakkam	4,500	Attipakkam.
		2,360	Thachampattu.
	2 Adukam	2,000	Adukam.
		1,639	Nayanur.
	3 Nathamur	4,500	Nathamur Bit I.
		3,683	Nathamur Bit II.
		562	Tiruvanainallur unreserve.
		904	Eadayar
		482	Gramam.
	4 Rishivendyam	3,278	Rishivendyam
		1,518	Chittal.
	5 Seedevi	2,772	Seedevi.
		1,200	Kunjaram.
	6 Pandur	1,090	Sirupakkam.
		955	Pandur.
2 Tirukkoyilur	1 Ravanthanallur	1,165	Ravathanallur.
		3,575	Kannangadu.
		4,314	Pavinjepattu.
	2 Kadavanur	4,065	Kadavanur.
	3 Swamimalai	4,262	Swamimalai.
		2,967	Avriyur.
3 Ulundurpet	1 Kattumailur	1,775	Kattumailur.
		1,694	Nangur.
	2 Krishnapuram	6,044	Krishnapuram.
	3 Thottapadi	1,448	Thottapadi.
		2,814	Kottalamalai.
	4 Varanjaram	823	Purasakurchi.
		1,263	Magarur.
		874	Varanaram.
	5 Alwarmalai, South	4,800	Southern portion of Alwarmalai.
		1,295	Kattakudi.
	6 Alwarmalai, North	4,000	Northern portion of Alwarmalai.
		3,390	Edaikkal.
	7 Kuttadi	1,700	Kuttadi.
		1,030	Kallamedu.
		758	Iruvelpattu unreserve.
4 Panruti	1 Kangirippu	5,535	Kangirippu.
		502	Thiruthraiyur.
	2 Pithavaram	2,719	Pitchauaram.
	3 Killai	638	Killai.
	4 Porto Novo unreserve ..	132	Porto Novo unreserve.
		171	Aryakosti.
5 Vridhachalam	1 Parur	3,064	Parur.
		1,100	Karmangudi.
		777	Kuppanatham.
		931	Narimanam.
	2 Semakkottai	6,257	Semakottai.
		1,251	Velangulam.
		862	Ammeri.
		444	Kattianallur unreserve

APPENDIX IV.

Statement of Forest Offences in the former Chingleput Forest Division (Vide *paragraph* 65).

Year.	*Unauthorized fellings and removal of forest produce.*	*Illicit grazing.*	*Other offences.*	*Total number of offences.*	*Revenue realized.*
(1)	(2)	(3)	(4)	(5)	(6)
					RS. A. P.
1947–48	661	655	9	1,325	4,137 14 0
1948–49	1,323	746	1	2,070	8,961 6 5
1949–50	1,918	603	8	2,529	15,683 8 0
1950–51	2,709	534	23	3,266	16,496 13 0
1951–52	3,547	841	75	4,463	10,735 8 0
1952–53	3,480	516	173	4,169	14,961 6 0
1953–54 .. .. }	Details not available.			4,168 }	Details not available.
1954–55 .. .. }				4,229 }	
1955–56	4,186	504	133	4,828	21,373 8 0

APPENDIX V.

Details of the pests and diseases of cashew and casuarina and their control

(vide *paragraph* 71).

A. Cashew.

(i) *Major pests.*

1. *The Cashew Bore—Plocaederns Furuginines L.*—Long stout white flushy frules of this beeth bore into the main trunk and root portion of the trees. Major portion of the grub stage is spent feeding on the bark layer. Life history extends over some months.

The leaves of the attacked tree twin pale yellow in the later stages. The tree dies eventually.

For controlling the pest, remove live stages from the trees and apply B.H.C. 0·1 per cent (1 lb. of 50 per cent B.H.C. in 6½ gallons of water) to the basal trunk and root portion. Destroy badly damaged trees with the gurbs.

2. *The Leaf Misur—Acrocercops Sy-Ngramma.*—This appears at the time of new flush. The small caterpillars mire into vendu leaves, the damage manifests itself as big holes in the leaf surface due to the drying and subsequent crumbling of the mirad area. Young plants suffer more due to the pest.

The pest can be kept under check by spraying Folidol 0.25 per cent (1 oz. in 12½ gallons).

3. *The Leaf-eating Caterpillar Cricula Trifenestratec.*—This is a sporadic pest causing considerable during serious outbreaks defoliating the trees extensively. The caterpillar is clothed in poisonous spires and is dangerous to handle.

Control.—Spray arsenicals (Calcium arsenale or lead arcenate) or parathian 0·25 per cent (Folidol).

4. *The Tea-Mosquito—Helopeltis Autonii.*—A reddish brown active capsid big anults and nymphs suck up the plant juice from tender plant parts more often the vegetative shoots. Its damage results in the death of young branches. When the inflorescence branches, it may result in the fading of flowers to some extent.

Control.—Dust or spray D.D.T. (5 per cent dust or 0·1 per cent spray).

5. *Caterpillar damaging fresh shoot tips and Inflorescence branches* (*Chelaria Haligramma*).—The small caterpillars damage shoot tips when new leaves are put forth. Sprouting inflorescence branches are also affected. Florescence buds are bowed and eaten. This leads to the stunting and drying of affected portions.

Control.—Spray D.D.T. or Tolidol.

6. *Leaf Thrips Selenothrips Rubrocinctus.*—This is serious on young plants. The leaves turn pale brown and the growth of the plant is affected.

Control.—Spray B.H.C. 0·05 per cent (1 lb. of B.H.C. 5 per cent in 13 gallons) or Folidol 0.25 per cent.

(ii) *Minor pests.*

Leaf Webben (*Corthaga Sp.*) on young plants, apple and nut-boring caterpillar. (*Thylacaptila panrosima*) green *Tortricid* caterpillar damaging apple and nut, leaf roller. leaf twisting Weeirl (Apodesus tranquebaricus, geomtrid caterpillar (Oenospila flanifuscata) feeding on fresh leaves, Chrysomelid beeths feeding in groups on tender twigs and leaves leaf (Mylloceros sp.) the caterpillar of Metavantia lyrtace, red ants, mealy bugs, scales, flower thrips, etc. Red ants, Proteenlugs scales and mealy bugs and are a source of nuisance.

(iii) *Cashew Store pest.*

1. *Triboleum Curtaneum—Red Gracla Hecthe* sevior on kernals in storage,

Control.—Furgination with bromide (1 lb. 1,000 cubic feet of space).

2. *Alphatolire Piceus*: attack kernels.
3. *Ephestia Cantella*—caterpillar damaging kernels.
4. Saw-toothed grain beethe—*Oryzaephilus Surinamemsis.*
5. *Necrobia Rufipes.*
6. *enebroides Mamitanicus*
7. *Plodia Interpunctella.*

The most serious and common pest is *Tribolesum Castumenm.*

Dusting of store-rooms with B.H.G., fumigation with methyl bromides, etc., may be adopted for controlling the insects.

(iv) *Diseases.*

1. *Apple Rot* (*Gleocosporium Sp.*).—Pink coloured of to fungus are seen on the apple causing rotting. Some of the affected apple chop prematured some times affect tree nuts also.

Control.—Spraying with 1 per cent B.M. or Copper firgisidy.

2. *Grey Blight or Leaf Spot* (*Pestalotia Dichaeta*).—Grey blight normally affects the leaves of the weak plants causing extensive damage to the leaves. The other leaf spot are pathogen to leaves of healthy trees also.

Control.—Spraying with 1 per cent B.M. or other copper fungicides.

3. *Die Back—Pellecalana Salenonicolor.*—Pinkish growth of the fungus will be seen on twigs causing cutting of the twigs. Affected branches dry up in due course.

Control.—The affected branches are to be cut about a foot below the healthy shoot and pasted with Bordeamse paste. The stem and other portions may be sprayed with 1 per cent B.M.

4. *Inflorescence Drying—Glocosporium Sp.*—Due to injuries caused by insects or due to weakness of the trees the inflorescenes an affected by causing complete drying up of the Glucosporicum flowers. The furnet bodies of the fungus are seen as prinkish to crimson coloured growth.

Control.—Spraying to inflorenscence before opening with 1 per cent B.M. or other copper fungicides.

5. *Sooty Mould—Capriodium Spp. and Meliolu Spp.*

Control.—The affected portions will be treated with insecticides like nicotine sulphate.

B. Casuarina.

(i) *Pests.*

1. *Ants.*—Seeds are liable to be carried away by ants. Addition of camphor to the seeds while storing or keeping the pots over smoke will drive away the ants. In the nursery beds, dusting of copper sulphate or wood ash will ward off the ants.

After germination of the seeds in the nursery beds, there may be white ant attack. Spraying the nursery beds with crude oil emulsion or crude oil emulsion with a decoction of the seeds of *Thevetia nerifolia* or copiocs watering will minimize the attack.

2. *Crickets—Brachytrypes Achatinus, Brachytrypes Portentosus and Gryllotalapa Spp.*—Cause serious damage to nursery seedlings. Using a half an inch wire mesh around the nursery bed or hand-pricking the crickets during the night with the help of the lamp is supposed to be effective.

3. *Bores—Phassus Malabaricus* is said to bore casuarina stems close to the ground. Plugging the borer holes with a blob of tar is quite effective in killing the caterpllar in the gallery. Badly attacked plants require extraction and burning.

4 *Bag worms.*—These are destructive to seedlings in hot weather. Copious watering or spraying with crude oil emulsion will eradicate the pest.

5. *Beetles.*—The grub of the beetle, *Coelasterna Scabrator*, F.B. attack by boring in the roots. The cutting, uprooting and burning of all the attacked trees is the best way to eradicate the pest.

(ii) *Diseases.*

1. *Black fungus.*—The black fungus, *Trichosporium Vesiculosum* does often great damage to plantations. The extraction of all dead and dying trees in the plantation speedily and working up of the soil at the end of each rotation will reduce the attack.

APPENDIX VI.

(*Vide* Paragraph 90.)

Outturn and prices obtained from fuel coupes.

Serial number and name of series.	1949–50. *Area of coupe.*	1949–50. *Price per acre.*	1949–50. *Yield.*	1950–51. *Area of coupe.*	1950–51. *Price per acre.*	1950–51. *Yield.*	1951–52. *Area of coupe.*	1951–52. *Price per acre.*	1951–52. *Yield.*	1952–53. *Area of coupe.*	1952–53. *Price per acre.*	1952–53. *Yield.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	ACS.	RS. A.	TONS.	ACS.	RS. A.	TONS.	ACS.	RS. A.	TONS.	ACS.	RS. A.	TONS.
I. South Arcot district—												
(a) Forests under the department—												
1 Athipakkam	..	..	..	31	5 0	11⅔	No demand.			No demand.		
2 Athipakkam South	44	2 2	85½	45	10 10	55	50	18 0	111	Do.		
3 Pichavaram	38	30 8	349½	34	115 0	648½	34	46 0	555	33	51 0	235
(b) Forests under the panchayat—												
4 Adukkam	20	33 0	40	28	30 11	49	32	13 0	41	No demand.		
5 Swamimalai	64	5 4	184	65	7 4	182	69	13 9	68	65	8 2	92
6 Nathanur	74	5 2	83½	62	6 12	41	44	5 8	18½	No demand.		
7 Alwarmalai	52	11 3	66	46	10 8	35½	54	15 4	25½	Do.		
8 Kunjaram	..	..	..	35	3 12	8	No demand.			Do.		
9 Edaikal	..	..	..	53	5 6	38*	53	5 8	36⅜	56	6 8	44
10 Kuttadi	..	..	..	27	3 0	38½	24	3 8	83½	No demand.		
11 Manakottai	..	..	..	60	3 0	123½	55	5 8	95½	58	6 0	142
12 Kotteri	..		..	60	4 4	127½	55	4 5	161	58	4 8	50
13 Karmangudi	..	..	..	42	14 6	56½	25	18 0	6	24	13 8	No removal.
14 Kattumailur	..	..	..	32	2 4	27	32	3 0	19½	33	2 8	16
15 Velangulam	..	..	..	32	6 6	45	30	6 5	21	30	5 12	36
II. North Arcot district—												
16 Pavanjipatti	96	13 0	267	95	10 0	473	106	46 0	463	110	23 0	340⅛

* NOTE.—Forty-eight cart-loads of thorns taken as equivalent to a ton.

	1953–54.			1954–55.			1955–56.			
	Area of coupe.	Price per acre.	Yield.	Area of coupe.	Price per acre.	Yield.	Area of coupe.	Price per acre.	Yield.	Remarks.
	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
	ACS.	RS. A.	TONS.	ACRES.	RS. A.	TONS.	ACS.	RS. A.	TONS.	
. South Arcot district— *cont.*										
(*a*) Forests under the department—*cont.*										
1 Athipakkam		Closed for ten years.		(*Vide* the South Arcot Collector's D. Dis. No. 45251/51, dated 12th November 1952 ; District Forest Officer's Nos. 883/52 and 2602/51-L.			Eliminated from working since 1954–55 plan.			
2 Athipakkam South		Do.			Do.			Do.		
3 Pichavaram	20	107 0	106½	26	70 0	..	30	70 0	149¾	
(*b*) Forests under the panchayat—*cont.*										
4 Adukkam		Sale dropped.			No demand.		26	21 0	28	
5 Swamimalai		Do.		63	10 4	..	67	12 0	62	
6 Nathanur		Closed for ten years.			Eliminated.			Eliminated.		
7 Alwarmalai		Sale dropped.			No demand.			Sale dropped.		
8 Kunjaram		Closed for ten years.		In South Arcot Collector's proceedings quoted above.				Do.		
9 Edaikal		Do.			Do.			Do.		
10 Kuttadi		Do.			Do.			Do.		
11 Manakottai		Sale dropped.			Sale dropped.			No demand.		
12 Kotteri		Do.			Do.			Do.		
13 Karmangudi		Do.			Do.			Do.		
14 Kattumailur		Do.			Do.			Sale dropped.		
15 Velangulam		Do.			Do.			No demand.		
II. North Arcot district—										
16 Pavanjipatti	108	81 0	569½	105	50 0	702	108	94 0	638	

APPENDIX VII.

Casuarina plantations clearelled under the orders of Chief Conservator of forests (Vide *Paragraph* 91).

Year. (1)	Areas felled. Locality. (2)		Area. (3)	Kind. (4)	Quantity. (5)	Price. Obtained. (6)
	Tirukkoyilur series.					
1954-55	Edayar	1945	47	Fuel / Twigs	93½ tons / 40 c. l.	2,305
Do.	Do.	1946	69	Fuel	108½ tons	2,220
Do.	Tiruvanninallur	1945	43	Do. / Twigs	91½ tons / 24 c.l.	1,600
Do.	Do.	1946	95	Fuel / Twigs	170 tons / 37½ c.l.	1,610
Do.	Gramam	1945	76	Fuel / Twigs	42 tons / 15 c.l.	810
Do.	Do.	1946	95	Fuel / Twigs	75½ tons / 32 c.l.	815
Do.	Thiruthanoyur	1945	119	Not worked by contractor.		3,020
Do.	Do.	1946	110	Fuel / Twigs	110 / 38	3,260
Do.	Porto Novo	1945	64	Firewood	118½	4,325
Do.	Do.	1946	30	Do.	..	1,111
Do.	Ariyakoshti	1946	82	Do.	122	17,000
1955-56	Iruvelipattu	1945	73	Do.	99 tons	600
Do.	Do.	1946	79	Twigs	45 c.l.	..
			152			
Do.	Tirutheri	1945	119	Firewood	61½ tons	950

APPENDIX VIII

Minor forest produce collected and revenue realised. (Vide *paragraph* 201).

Year of operation. (1)	Name of lease. (2)	Amount realized. (3) RS. A. P.	Quantity collected. Kind of produce. (4)	Yield. (5)
1949–50	Minor forest produce—			
	Nayanur reserved forest	35 0 0	Tamarind	760 lb.
	Adukam reserved forest	250 0 0	Do.	4,128 lb.
	Edaikal reserved forest	4 0 0	No removal.	
1950–51	Minor forest produce—			
	Nayanur reserved forest	4 0 0	No removal.	
	Adukkam reserved forest	192 0 0	Tamarind	880 lb.
1951–52	Minor forest produce—			
	Adukkam reserved forest	116 0 0	No removals.	
	Nayanur reserved forest	15 0 0	Do.	
1952–53	Minor forest produce—			
	Nayanur reserved forest	15 0 0	No removals.	
	Adukkam reserved forest	116 0 0	Do.	
	Usufructs of cashew trees in Kangirippu—			
	Bit No. I	270 0 0	No removals.	
	Bit No. II	530 0 0	Cashewnut	448 M.M.
	Minor forest produce Karmangudi.	100 0 0	Inchi	114 head-loads.
	Do. Nayanur	15 0 0	No removals.	
	Do. Parur	20 0 0	Tamarind	12¼ Viss.
	Do. Adukkam	116 0 0	No removals.	
1953–54	Avaram bark in Alwarmalai north and south, Sirupakkam, Pandur, Seedevi, Nathamur, Edaikal, Kuttadi, Kuttakudi reserved forest.	101 0 0	Avaram bark	2,646 lb.

APPENDIX VIII—*cont*

Minor Forest Produce collected and revenue realized (Vide *Paragraph* 201) —cont.

Year of operation. (1)	*Name of lease.* (2)	*Amount realized.* (3) RS.	A.	P.	*Quantity collected.* *Kind of produce.* (4)	*Yield.* (5)
1953–54—cont.	Minor forest produce—					
	Varanjaram reserved forest ..	25	0	0	Zizyphus jujuba fruits ..	2,640 lb.
	Parur rsserved forest	21	0	0	Tamarind	200 lb.
	Adukam reserved forest ..	225	0	0	Do.	6,000 lb.
	Cashewnuts—					
	Kangiruppu Bit I	315	0	0	Cashewnut	395 M.M.
	Kangiruppu Bit II	31	0	0	No removals.	
1954–55 ..	Minor forest produce Adukam ..	300	0	0	Tamarind (shelled) ..	4,000 lb.
	Avaram bark in Alwarmalai north and south, Kuttakudi, Sirupakkam, Pandur, Seedevi, Nathanur, Kuttadi reserved forests.	130	0	0	Avaram bark	No removals.
	Cashewnuts—					
	Kangiruppu Bit I	35	0	0	Cashewnut	46 M.M.
	Kangiruppu Bit II	630	0	0	Do.	700 M.M.
	Minor forest produce, Nayanur reserved forest.	24	0	0	No removals.	
	Parur reserved forest	22	0	0	No removals.	
1955–56 ..	Cashewnuts in Kangiruppu reserved forest Bit I.	37	0	0	No removals.	
	Cashewnuts in Kangiruppu reserved forest Bit II.	645	0	0	Cashewnut	361 M.M.
	Minor forest produce in Adukkam reserved forest.	616	0	0	Tamarind (shelled) ..	4,600 lb.
	Avaram bark in Tirukoyilur range.	170	0	0	Avaram bark	1,720 lb.
	Minor forest produce in Parur reserved forest.	22	0	0	Tamarind	578 lb.
	Minor forest produce in Narimanam reserved forest.	25	0	0	No remarks.	

APPENDIX IX.

Areas prescribed for felling and those actually felled in Fuel Working Circle. (vide *paragraph* 155.)

Serial number and name of series.	1949–50.				1950–51.				1951–52.				1952–53.			
	Prescribed.		*Done.*		*Prescribed.*		*Done.*		*Prescribed.*		*Done.*		*Prescribed.*		*Done.*	
	Coupe number.	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area*	*Coupe number.*	*Area.*	*Coupe. number.*	*Area.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
I. South Arcot district—																
(*a*) Forest under the department—																
1 Athipakkam ..	I	30	Sale dropped.		II	30	I	31	No demand.		No demand.		No demand.		..	..
2 Athipakkam, South.	I	46	I	44	II	46	II	45	III	46	III	50	Do.		..	..
3 Ritchavaram ..	I	28	I	38	II	28	II	34	III	28	III	34	IV	28	IV	33
(*b*) Forest under the Panchayat—																
4 Adukkam	I	29	I	20	II	29	II	28	III	29	III	32	IV	29	No demand.	
5 Swamimalai ..	I	62	I	64	II	62	II	65	III	62	III	69	IV	62	IV	65
6 Nathamur	I	66	I	74	II	66	II	62	III	66	III	44	No demand.		..	..
7 Alwarmalai ..	I	48	I	52	II	48	VI	46	IV	48	III	54	Do.		..	..
8 Kunjaram		Sale dropped.			I	30	I	35	No demand.		No demand.		Do.		..	..
9 Edukai		Do.			I	58	I	53	II	58	II	53	III	58	III	56
10 Kuttadi		Do.			I	26	I	27	II	26	II	24	III	58	III	56
11 Manakottai ..		Do.			I	56	I	60	II	56	II	55	III	56	III	58
12 Kotteri	..	..	..	..	I	56	I	60	II	56	II	55	III	56	III	58
13 Karmangudi ..		Sale dropped.			I	40	I	42	II	24	II	25	III	32	III	24
14 Kathumailur ..		Do.			I	32	I	32	II	32	II	32	III	32	III	32
15 Velangulam ..		Do.			I	30	I	32	II	30	II	30	III	30	III	30
II. North Arcot district—																
16 Pavunjipatty ..	I	90	I	96	II	101	II	95	III	101	III	106	IV	97	IV	110·5

Serial number and name of series.	1953–54.				1954–55.				1955–56.				*Remarks.*
	Prescribed.		*Done.*		*Prescribed.*		*Done.*		*Prescribed.*		*Done.*		
	Coupe number.	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area.*	*Coupe number.*	*Area.*	
	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
I. South Arcot district—													
(a) Forest under the department—													
1 Athipakkam ..	Working of coupes in the series closed for 10 years from 1952 onwards—South Arcot Collector's D.Dis. No. 4551/51, dated 12th November 1952.												
2 Athipakkam, South.							Do.						
3 Pitchavarm ..	V	25	V	20	VI	25	VI	26	VII	32	VII	30	
(b) Forest under the Panchayat—													
4 Adukkam	V	29	No demand.		VI	29	No demand.		VII	29	IV	26	
5 Swamimalai ..	V	62	Do.		VI	62	V	63	VII	62	VI	67	
6 Nathamur	Working of coupe stopped for 10 years from 1952 onwards—South Arcot Collector's D.Dis. No. 45251/51, dated 12th November 1952.												
7 Alwarmalai ..		Sale dropped.					No demand.			No demand.			
8 Kunjaram	Working of coupe stopped for 10 years from 1952 onwards—South Arcot Collector's D.Dis. No. 45251/51, dated 12th November 1952.												
9 Edukal							Do.						
10 Kuttadi							Do.						
11 Manakottai ..		Sale dropped.					Sale dropped.			No demand.			
12 Kotteri		Do.					Do.			Do.			
13 Karmangudi ..		Do.					Do.			Do.			
14 Kathumailur ..		Do.					Do.			Do.			
15 Velangulam ..		Do.					Do.			Do.			
II. North Arcot district—													
16 Pavunjipatty ..	V	108	V	108	VI	102	VI	105	VII	100	VII	108	

APPENDIX X—*cont.*

Summary of revenue and expenditure in the former Chingleput Forest Division (Vide *Paragraph* 225)—cont.

(*a*) Revenue.

Particulars. (1)	*Panchayat.* (2)	*Extension of casuarina.* (3)	*Ordinary areas.* (4)	*Ex-Zamin forests.* (5)	*Total.* (6)
1947–48.					
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
A. Removals by Government agency—					
1. Firewood and charcoal	....	522 0 0	....	....	522 0 0
2. Sandalwood	....	....	....	....	....
3. Other produce	....	53 12 0	....	....	53 12 0
B. Removals by consumers and purchasers—					
1. Timber	....	2,569 4 0	....	....	2,569 4 0
2. Firewood and charcoal	....	....	....	....	....
3. Grazing and fodder grass	....	6,194 2 0	....	....	6,194 2 0
4. Other produce	....	1,455 2 0	....	....	1,455 2 0
C. Drift and waifwood	....	73 15 0	....	....	73 15 0
D. Miscellaneous	....	5,775 9 0	....	....	5,775 9 0
E. Refunds	....	....	....	....	....
Total	....	16,643 12 0	....	....	16,643 12 0
1948–49.					
A. Removals by Government agency—					
1. Firewood and charcoal	....	822 6 0	26 12 0	....	853 2 0
2. Sandalwood	....	....	....	....	....
3. Other produce	....	19 6 0	....	....	19 6 0
B. Removals by consumers and purchasers—					
1. Timber	....	....	....	....	....
2. Firewood and charcoal	....	2,182 15 0	32,711 13 0	....	34,894 12 0
3. Grazing and fooder grass	....	7,694 6 0	2,402 9 0	....	10,096 15 0
4. Other produce	....	1,851 11 0	310 15 0	....	2,162 10 0
C. Drift and waifwood	....	126 9 0	161 9 3	....	288 2 3
D. Miscellaneous	....	8,377 1 0	2,305 8 6	....	10,862 9 6
E. Refunds	....	....	....	....	....
Total	....	21,078 8 0	37,919 2 9	....	58,997 8 9

1949-50

A. Removals by Government agency—					
Firewood and charcoal	....	109 8 0	73 5 0	....	182 13 0
Sandalwood	....	....	....	....	....
Other produce	....	342 1 0	....	....	342 1 0
B. Removals by consumers and purchasers—					
1. Timber	....	5 1 0	....	....	5 1 0
2. Firewood and charcoal	....	4,466 10 0	44,092 2 0	....	48,558 12 0
3. Grazing and fodder grass	....	28,294 4 0	4,524 5 0	....	32,818 9 0
4. Other produce	....	9,262 13 0	653 7 0	....	9,916 4 0
C. Drift and waifwood	....	114 15 0	140 4 0	....	255 3 0
D. Miscellaneous	....	14,773 14 0	2,918 0 0	....	17,691 14 0
E. Refunds	....	....	....	....	....
Total	....	57,369 2 0	52,401 7 0	....	1,09,770 9 0

1950-51.

A. Removals by Government agency—					
1. Firewood and charcoal	....	6 0 0	7 8 0	....	13 8 0
2. Sandalwood	....	....	....	....	....
3. Other produce	....	28 0 0	18 5 6	....	46 5 6
B. Removals by consumers and purchasers—					
1. Timber	....	994 0 0	....	....	994 0 0
2. Firewood and charcoal	....	11,611 10 0	51,267 6 6	....	62,879 0 6
3. Grazing and fodder grass	....	17,163 8 6	2,669 2 0	....	19,832 10 6
4. Other produce	....	4,454 10 6	953 6 7	....	5,408 1 1
C. Drift and waifwood	....	203 7 0	113 14 3	....	317 5 3
D. Miscellaneous	....	42,984 12 3	2,947 10 0	....	45,932 6 3
E. Refunds	....	178 10 9	....	....	178 10 9
Total	....	77,267 9 6	57,977 4 10	....	1,35,244 14 4

1951-52.

A. Removals by Government agency—					
1. Firewood and charcoal	....	21 2 0	37 0 0	....	58 2 0
2. Sandalwood	....	....	....	....	....
3. Other produce	....	150 8 0	15 0 0	....	165 8 0
B. Removals by consumers and purchasers—					
1. Timber	....	....	....	....	....
2. Firewood and charcoal	....	2,511 10 0	5,859 15 3	....	57,371 9 3
3. Grazing and fodder grass	....	15,200 7 0	3,176 2 0	....	18,376 9 0
4. Other produce	....	1,117 14 0	292 12 1	....	1,410 10 1
C. Drift and waifwood	....	202 2 9	345 2 6	....	547 5 3
D. Miscellaneous	....	70,915 5 0	4,045 15 10	318 0 0	75,279 4 10
Total	....	90,119 0 9	....	....	1,53,209 0 5
	....	134 8 0	62,771 15 8	318 0 0	134 8 0
		89,984 8 9			1,53,074 8 5

APPENDIX X—*cont.*

Summary of revenue and expenditure in the former Chingleput Forest Division (vide *paragraph* 225)—cont.

Particulars. (1)	*Panchayats.* (2)	*Extension of casuarina.* (3)	*Ordinary areas.* (4)	*Ex-Zamin forests.* (5)	*Total.* (6)
1952–53.					
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
A. Removals by Government agency—					
1. Firewood and charcoal	23 4 0	242 4 0	80 0 0	....	345 8 0
2. Sandalwood	....	....	....	....	....
3. Other produce	....	35 2 0	....	....	35 2 0
B. Removals by consumers and purchasers—					
1. Timber	....	....	....	....	....
2. Firewood and charcoal	6,661 10 0	2,917 10 6	38,655 14 0	....	48,235 2 6
3. Grazing and fodder grass	28,707 9 0	12,330 4 6	3,317 7 2	....	44,355 4 6
4. Other produce	3,027 10 0	1,921 8 6	223 8 2	....	5,172 10 6
C. Drift and waif wood	309 11 0	192 15 6	48 3 0	....	550 13 6
D. Miscellaneous	19,802 8 0	6,244 14 1	3,285 10 0	....	29,333 0 1
					1,28,027 9 1
E. Refunds	....	179 0 0	....	....	179 0 0
Total	58,532 4 0	23,884 11 1	45,610 10 0	....	1,28,027 9 1
1953–54.					
A. Removals by Government Agency—					
1. Firewood and charcoal	23 0 0	1,916 12 0	3 0 0	....	1,942 12 0
2. Sandal wood	....	....	....	....	....
3. Other produce	....	2 12 0	2 8 0	....	5 4 0
B. Removals by consumers and purchasers—					
1. Timber	5 14 0	26 0 0	....	....	31 14 0
2. Firewood and charcoal	2,685 3 0	38,842 8 0	23,482 3 0	....	65,009 14 0
3. Grazing and fodder grass	18,003 14 0	8,788 15 0	2,050 2 0	....	28,842 15 0
4. Other produce	1,666 4 0	1,043 5 0	560 12 0	....	3,270 5 0
C. Drift and waif wood	543 0 0	137 4 0	488 7 0	....	1,168 11 0
D. Miscellaneous	17,380 3 0	5,028 1 0	2,881 8 0	....	25,289 12 0
E. Refunds	....	171 0 0	....	....	....
Total	40,307 6 0	55,785 9 0	29,468 8 0	....	1,25,561 7 0
	....	171 0 0	....	....	171 0 0
	....	55,614 9 0	....	....	1,25,390 7 0

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1954–55.

A. Removals by Government Agency—					
1. Firewood and charcoal	....	312 0 0	....	....	312 0 0
2. Sandal wood	....	....	....	....	....
3. Other produce	....	117 0 0	....	....	117 0 0
B. Removals by consumers and purchasers—					
1. Timber	....	....	....	....	....
2. Firewood and charcoal	987 0 0	1,56,830 0 0	7,856 0 0	....	1,65,673 0 0
3. Grazing and fodder grass	20,856 0 0	9,566 0 0	2,842 0 0	....	33,234 0 0
4. Other produce	3,199 0 0	1,821 0 0	792 0 0	....	5,812 0 0
C. Drift and waif wood	614 0 0	135 0 0	80 0 0	....	829 0 0
D. Miscellaneous	11,710 0 0	5,689 0 0	3,475 0 0	....	20,874 0 0
E. Refunds	....	100 0 0	....	....	100 0 0
Total ..	37,366 0 0	1,74,570 0 0	15,015 0 0	....	2,26,951 0 0
	....	— 100 0 0	....	....	100 0 0
	....	1,74,470 0 0	....	....	2,26,851 0 0

1955–56.

A. Removals by Government Agency—					
1. Firewood and charcoal	....	260 0 0	....	....	260 8 0
2. Sandal wood	61 0 0	....	....	....	61 0 0
3. Other produce	2 0 0	30 0 0	....	....	32 0 0
B. Removals by consumerss and purchasers—					
1. Timber	....	....	....	....	....
2. Firewood and charcoal	5,967 11 0	61,321 4 0	30,664 4 0	145 0 0	98,098 12 0
3. Grazing and fodder grass	24,592 10 0	14,671 14 0	2,297 4 0	21 4 0	41,863 0 0
4. Other produce	12,378 5 0	3,033 2 0	612 1 0	160 8 0	16,184 0 0
C. Drift and waifwood	609 1 0	315 8 0	141 8 0	40 10 0	1,106 11 0
D. Miscellaneous	14,102 11 0	9,599 11 0	3,758 9 0	1,956 5 0	29,417 4 0
E. Refunds	....	....	348 0 0	....	348 0 0
	57,813 6 0	89,231 15 0	37,474 3 0	2,323 11 0	1,86,843 3 0
	....	....	348 0 0	....	348 0 0
Total ..	57,813 6 0	89,231 15 0	37,126 3 0	2,323 11 0	1,86,495 3 0

APPENDIX X—*cont.*

Summary of revenue and expenditure in the former Chingleput Forest Division (vide *paragraph* 225)—cont.

Particulars. (1)	Panchayats. (2) RS. A. P.	Extension of casuarina. (3) RS. A. P.	Ordinary. (4) RS. A. P.	Estate forests. (5) RS. A. P.	Total. (6) RS. A. P.
		1947–48.			
A. Conservancy and Works—					
(a) Removal by Government agency—					
(1) Timber	....	....	....	....	....
(2) Firewood and charcoal	....	....	....	....	....
(3) Bamboos	....	....	....	....	....
(4) Sandal wood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(b) Removal by consumers and purchasers	....	8,669 10 0	....	....	8,669 10 0
(c) Stores, tools and plants	....	888 6 0	....	....	888 6 0
(d) Roads and bridges	....	....	....	....	....
(e) Rates and taxes	....	....	....	....	....
(f) Buildings	....	....	....	....	....
(g) Regeneration—					
(1) General	....	1,06,472 15 0	....	....	1,06,472 15 0
(2) Development schemes	....	....	....	....	....
(h) Fire protection	....	....	....	....	....
(i) Other works	....	163 0 0	....	....	163 0 0
Total	....	1,16,193 15 0	....	....	
B. Establishment—					
(a) Pay	....	62,795 2 0	....	....	62,795 2 0
(b) Allowances and honorarias	....	37,769 14 0	....	....	37,769 14 0
(c) Contingencies	....	4,394 12 0	....	....	4,394 12 0
Total	....	1,04,959 12 0	....	....	
				Grand total	2,21,153 11 0

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1948–49.

A. Conservancy and works—					
(a) Removal by Government agency—					
(1) Timber	....	35 0 0	....	....	35 0 0
(2) Firewood and charcoal	....	....	....	....	....
(3) Bamboos	....	....	....	....	....
(4) Sandal wood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(b) Removal by consumers and purchasers	....	11,044 8 0	6,895 15 0	....	17,940 7 0
(c) Stores, tools and plants	....	29,751 9 0	4 10 0	....	29,756 3 0
(d) Roads and bridges	....	....	1,266 13 0	....	1,266 13 0
(e) Rates and taxes	....	....	20 0 0	....	20 0 0
(f) Buildings	....	21 0 0	1,260 7 0	....	1,281 7 0
(g) Regeneration—					
(1) General	....	33,266 9 0	953 4 0	....	34,219 13 0
(2) Development schemes	....	....	....	....	....
(h) Fire protection	....	....	88 0 0	....	88 0 0
(i) Other works	....	201 0 0	....	....	201 0 0
Total	....	74,319 10 0	10,489 0 0		
B. Establishment—					
(a) Pay	....	58,400 9 0	7,501 12 0	....	65,902 5 0
(b) Allowances and honorarias	....	32,192 3 0	6,146 9 0	....	45,338 12 0
(c) Contingencies	....	3,743 10 0	98 8 0	....	3,842 2 0
Total	....	1,01,336 6 0	13,746 13 0	....	
				Grand total ..	1,99,891 14 0

1949–50.

A. Conservancy and Works—					
(a) Removal by Government agency—					
(1) Timber	....	....	....	....	....
(2) Firewood and charcoal	....	....	....	....	....
(3) Bamboos	....	....	....	....	....
(4) Sandalwood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(b) Removal by consumers and purchasers	3,393 10 0	14,047 7 0	5,135 12 6	....	22,576 13 6
(c) Stores, tools and plants	....	3,666 0 0	50 0 0	....	3,716 0 0
(d) Roads and bridges	....	....	1,310 13 0	....	1,310 13 0
(e) Rates and taxes	....	....	....	....	....
(f) Buildings	....	54 7 0	1,095 2 0	....	1,149 9 0
(g) Regeneration—					
(1) General	....	42,932 8 6	1,041 11 0	....	43,974 3 6
(2) Development schemes	....	....	....	....	....
(h) Fire protection	....	113 11 0	88 0 0	....	201 11 0
(i) Other works	....	614 3 0	171 0 0	....	785 3 0
Total ..	3,393 10 0	61,428 4 6	8,892 6 6	....	

APPENDIX.

Summary of revenue and expenditure in the former Chingleput Forest Division (vide *paragraph* 225).

1949–50—*cont.*

Particulars. (1)	*Panchayats.* (2) RS. A. P.	*Extension of casuarina.* (3) RS. A. P.	*Ordinary areas.* (4) RS. A. P.	*Ex-Zamin forests.* (5) RS. A. P.	*Total.* (6) RS. A. P.
E. Establishment—					
(a) Pay	4,052 0 0	49,478 0 0	7,122 2 0	....	60,652 2 0
(b) Allowances and honorarias	3,147 5 0	36,875 3 0	6,472 12 0	....	46,495 4 0
(c) Contingencies	....	5,933 11 9	37 3 0	....	5,970 14 9
Total	7,199 5 0	92,286 14 9	13,632 1 0	....	....
				Grand total	1,86,832 9 9

1950–51.

Particulars. (1)	*Panchayats.* (2) RS. A. P.	*Extension of casuarina.* (3) RS. A. P.	*Ordinary areas.* (4) RS. A. P.	*Ex-Zamin forests.* (5) RS. A. P.	*Total.* (6) RS. A. P.
A. Conservancy and Works—					
(a) Removal by Government agency—					
(1) Timber		....	....	....	....
(2) Firewood and charcoal	....	....	....	....	....
(3) Bamboos	....	....	....	....	....
(4) Sandalwood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(b) Removal by consumers and purchasers	6,140 8 0	12,672 4 0	3,876 1 0	....	22,688 13 0
(c) Stores, tools and plants	....	282 15 9	....	....	282 15 9
(d) Roads and bridges	....	....	95 0 0	....	95 0 0
(e) Rates and taxes	....	....	....	....	....
(f) Buildings	....	7 0 0	629 12 0	....	636 12 0
(g) Regeneration—	....			....	
(1) General	....	32,933 15 0	142 0 0	....	33,075 15 0
(2) Development schemes	....	....	....	....	....
(h) Fire protection	....	....	88 2 0	....	88 2 0
(i) Other works	....	....	....	....	....
Total	6,140 8 0	45,896 2 9	4,830 15 0	....	
B. Establishment—					
(a) Pay	8,476 15 0	44,758 11 0	6,817 13 0	....	60,053 7 0
(b) Allowances and Honorarias	6,609 3 0	23,068 15 0	5,585 1 0	....	44,263 3 0
(c) Contingencies	....	5,573 12 9	38 7 6	....	6,612 4 3
Total	15,086 2 0	82,401 6 9	12,441 5 6	....	
				Grand total	1,66,796 8 0

1951–52.

A. Conservancy and Works—					
(*a*) Removal by Government agency—					
(1) Timber	....	....	....	....	....
(2) Firewood and charcoal	....	....	....	....	....
(3) Bamboos	....	....	....	....	....
(4) Sandalwood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(*b*) Removal by consumers and purchasers	8,966 1 0	10,121 9 0	3,989 11 0	1,223 9 0	24,300 14 0
(*c*) Stores, tools and plants	....	292 10 0	4,625 15 0	....	4,918 9 0
(*d*) Roads and bridges	....	....	1,878 9 0	....	1,878 9 0
(*e*) Rates and taxes	....	....	....	....	....
(*f*) Buildings	....	370 12 0	1,202 12 3	....	1,573 8 3
(*g*) Regeneration—					
(1) General	....	21,905 14 0	1,142 3 0	....	23,048 1 0
(2) Development schemes	....	....	....	....	....
(*h*) Fire protection	....	....	88 0 0	....	88 0 0
(*i*) Other works	....	1,315 11 0	102 0 0	....	1,417 11 0
Total ..	8,966 1 0	34,006 8 0	13,029 2 3	1,223 9 0	
B. Establishment—					
(*a*) Pay	11,423 14 0	39,946 1 0	6,855 3 0	839 5 0	59,064 7 0
(*b*) Allowances and Honorarias	9,304 15 0	31,104 4 0	5,955 14 0	804 4 0	47,169 5 0
(*c*) Contingencies	13 12 0	5,435 3 6	36 15 0	....	5,485 14 6
Total ..	20,742 9 0	76,485 8 6	12,848 0 0	1,643 9 0	
				Grand total ..	1,68,944 14 9

1952–53.

A. Conservancy and Works—					
(*a*) Removal by Government agency—					
(1) Timber	....	....	....	....	....
(2) Firewood and charcoal	....	....	....	....	....
(3) Bamboos	....	....	....	....	....
(4) Sandalwood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(*b*) Removal by consumers and purchasers	9,642 0 0	10,759 14 0	7,440 13 0	....	27,842 11 0
(*c*) Stores, tools and plants	....	425 0 0	143 4 0	....	568 4 0
(*d*) Roads and bridges	....	....	1,285 13 0	....	1,285 13 0
(*e*) Rents and taxes	....	....	....	....	2,251 12 0
(*f*) Buildings	....	255 0 0	1,996 12 0	....	18,683 14 0
(*g*) Regeneration—					
(1) General	....	18,088 0 0	595 14 0	....	....
(2) Development schemes	....	....	....	....	....
(*h*) Fire protection	....	....	88 0 0	....	88 0 0
(*i*) **Other works**	....	2,185 4 0	99 0 0	....	2,284 4 0
Total ..	9,642 0 0	31,713 2 0	11,649 8 0	....	

APPENDIX X—*cont.*

Summary of revenue and expenditure in the former Chingleput Forest Division (vide *paragraph* 225)—cont.

Particulars. (1)	*Panchayats.* (2)	*Extension of casuarina.* (3) RS. A. P.	*Ordinary areas.* (4) RS. A. P.	*Ex-Zamin forest.* (5) RS. A. P.	*Total* (6) RS. A. P.
1952–52—*cont.*					
B. Establishment—					
(*a*) Pay	11,369 3 0	45,021 3 0	11,452 6 0	....	67,842 12 0
(*b*) Allowances and Honorarias	9,679 5 0	34,253 5 0	10,430 2 0	....	54,362 12 0
(*c*) Contingencies	72 14 0	6,582 14 0	31 13 0	....	6,687 9 0
Total ..	21,121 6 0	85,857 6 0	21,914 5 0	....	
				Grand total ..	1,81,897 11 0
1953–54.					
A. Conservancy and Works—					
(*a*) Removal by Government agency—					
(1) Timber	....	....	....	....	....
(2) Firewood and charcoal	....	1,968 8 0	....	....	1,968 8 0
(3) Bamboos	....	....	....	....	....
(4) Sandalwood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(*b*) Removal by consumers and purchasers	9,553 10 0	12,246 9 0	7,531 13 0	....	29,332 0 0
(*c*) Stores tools and plants	....	1,955 9 0	88 12 0	....	2,044 5 0
(*d*) Roads and bridges	....	....	2,187 10 0	....	2,187 10 0
(*e*) Rates and taxes	....	....	....	....	....
(*f*) Buildings	....	104 0 0	3,119 3 0	....	3,223 3 0
(*g*) Regeneration—					
(1) General	10,151 5 0	15,061 2 0	5,980 5 0	....	31,192 12 0
(2) Development schemes	....	....	....	....	....
(*h*) Fire protection	....	....	58 0 0	....	58 0 0
(*i*) Other works	698 0 0	1,004 4 0	101 0 0	....	1,803 4 0
Total ..	20,402 15 0	32,340 0 0	19,066 11 0	....	....

B. Establishment—					
(a) Pay ..	12,646 10 0	51,741 6 0	10,740 5 0	....	75,128 5 0
(b) Allowances and Honorarias	10,633 9 0	37,263 4 0	9,798 5 0	....	57,695 2 0
(c) Contingencies	107 10 0	6,740 6 0	25 0 0	....	6,873 7 0
Total	23,387 13 0	95,745 0 0	20,564 10 0	....	....
				Grand total ..	2,11,506 8 0

1954–55.

A. Conservancy and Works—					
(a) Removal by Government agency—					
(1) Timber	....	109 0 0	....	....	109 0 0
(2) Firewood and charcoal	....	....	....	....	....
(3) Bamboos	....	....	....	....	....
(4) Sandalwood	....	....	....	....	....
(5) Other produce	....	52 0 0	3,721 0 0	....	3,773 0 0
(b) Removal by consumers and purchasers	9,712 0 0	13,787 0 0	4,265 0 0	....	27,764 0 0
(c) Stores tools and plants	....	1,050 0 0	1,602 0 0	....	2,652 0 0
(d) Roads and bridges	....	....	....	....	....
(e) Rates and taxes	....	....	....	....	....
(f) Buildings	....	154 0 0	1,745 0 0	....	1,899 0 0
(g) Regeneration—					
(1) General	....	....	12,808 0 0	....	12,808 0 0
(2) Development schemes	....	....	....	....	....
(h) Fire protection	....	....	127 0 0	....	127 0 0
(i) Other works	....	905 0 0	27 0 0	....	932 0 0
Total ..	9,712 0 0	16,057 0 0	24,295 0 0	....	....
B. Establishment—					
(a) Pay ..	12,421 0 0	50,346 0 0	10,711 0 0	....	73,478 0 0
(b) Allowances and Honorarias	10,426 0 0	36,233 0 0	9,361 0 0	....	56,020 0 0
(c) Contingencies	100 0 0	8,254 0 0	70 0 0	....	8,424 0 0
Total ..	22,947 0 0	94,833 0 0	20,142 0 0	....	....
				Grand total ..	1,87,986 0 0

APPENDIX X—*cont.*

Summary of revenue and expenditure in the former Chingleput Forest Division (vide *paragraph* 225)—cont.

1955–56.

Particulars. (1)	*Panchayats.* (2) RS. A. P.	*Extension of casuarina.* (3) RS. A. P.	*Ordinary areas* (4) RS. A. P.	*Ex-Zamin forest.* (5) RS. A. P.	*Total.* (6) RS. A. P.
A. Conservancy and works—					
(a) Removal by Government agency—					
(1) Timber	....	....	....	....	....
(2) Firewood and charcoal	....	35 0 0	....	....	35 0 0
(3) Bamboos	....	....	....	....	....
(4) Sandalwood	....	....	....	....	....
(5) Other produce	....	....	....	....	....
(b) Removal by consumers and purchasers	11,570 3 0	13,378 12 6	4,756 12 0	3,192 0 0	32,897 11 6
(c) Stores tools and plants	....	....	5,090 8 0	....	5,090 8 0
(d) Roads and bridges	....	....	1,959 0 0	....	1,959 0 0
(e) Rates and taxes	....	....	85 10 0	....	85 10 0
(f) Buildings	....	79 0 0	5,746 12 0	....	5,825 12 0
(g) Regeneration—					
(1) General	....	15,416 15 0	173 0 0	....	15,589 15 0
(2) Development schemes	....	38,360 0 0	....	....	38,360 0 0
(h) Fire protection	....	431 2 0	....	....	431 2 0
(i) Other works	....	....	115 0 0	....	115 0 0
Total	11,570 3 0	67,700 13 6	17,926 10 0	3,192 0 0	....
B. Establishment—					
(a) Pay	13,621 0 0	54,923 5 0	7,831 3 0	2,579 7 0	78,955 9 0
(b) Allowances and honorarias	11,801 10 0	24,471 9 0	6,459 1 0	2,604 0 0	45,336 4 0
(c) Contingencies	....	8,773 6 6	31 6 0	....	8,804 12 6
Total	25,423 4 0	88,168 4 6	14,321 10 0	5,183 7 0	....
Grand total					2,33,486 4 0

APPENDIX XI.

Details of Stock-mapping of Class III. Reserved Forests. (vide *Paragraph*—193.)

Name of the range.	Name of the Reserved forest.	Total. Area in-acres. Notified area.	Plani-metered area.	R.A.	I.A.	Classification of Forests into Types. I.B.	IIAa.	IIAb(i).	IIAb(ii).	IIBa.	IIBb.	Unfit areas.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1 Villupuram Range.	1 Nattanur	4,500·0	4,613·7	..	3,603·8	..	..	876·4	..	..	..	(G) 41·9 (K) 91·6	
	2 Nattanur II	3,683·0	3,699·9	..	..	..	..	2,617·1	..	..	..	(K) 1,047·6 (P) 35·2	
	3 Sittal	1,518·0	1,518·3	..	305·5	..	..	..	1,209·8	..	..	(T) 3·0	
	4 Adukkam	2,000·0	2,395·0	..	1,125·5	1,048·3	..	..	..	..	204·1	(K) 17·1	
	5 Kunjaram	1,200·0	1,254·4	..	676·9	..	..	466·5	..	..	..	(T) 16·9 (P) 4·1 (R) 90·0	
	6 Nayanur	1,639·0	1,712·6	168·9	1,314·8	..	..	..	..	..	..	(K) 19·0 (T) 27·0 (BS) 38·4	
	7 Seedeir	2,772·0	3,130·3	14·1	1,634·8	..	..	1,151·8	..	..	..	(R) 143·9 (R) 261·2 (K) 11·2 (P) 37·0 (T) 20·2	
	8 Athipakkam	4,494·0	4,464·40	401·6	3,213·0	..	..	..	243·2	..	278·4	(K) 97·3 (T) 230·9	
	9 Thachampattu ..	2,216·0	2,165·0	..	1,993·6	148·0	..	..	..	..	3·4	(T) 20·0	
2 Vriddhachalam Range.	1 Semakottai and extension.	6,257·0	6,196·0	..	5,789·0	..	..	402·0	..	..	..	(T) 5·0	
	2 Narianānam	928·0	905·9	..	900·9	..	..	..	..	..	..	(T) 5·0	
	3 Velangulam	1,211·0	1,260·6	..	1,260·6	..	..	..	..	..	..	..	
	4 Ammeri..	863·0	841·0	..	839·3	..	..	..	..	..	..	(T) 2·5	
3 Panruti Range.	1 Kangiruppu Bit I, ...	2,956·0	3,126·1	..	2,374·6	..	..	751·5	..	..	..	..	

APPENDIX XI—*cont.*

Details of Stock-mapping of Class III. Reserved Forests (vide *Paragraph*—193).—cont.

Name of the range.	Name of the Reserved forest.	Area in acres. Notified area.	Area in acres. Planimetered area.	Total. R.A.	Total. I.A.	Classification of Forests into Types. I.B.	IIAa.	IIAb(i).	IIAb(ii).	IIBa.	IIBb.	Unfit areas.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
3 Panruti Range—*cont.*	2 Kanigruppu Bitt II.	2,579·0	2,679·4	..	2,580·2	..	..	..	..	..	..	....	Kumried area 99·2 acres.
	3 Kille	638·0	707·6	19·0	49·0	..	..	148·8	..	..	..	(B)W 222·8	
												(SA) 268·0	
	4 Pichavaram and extension.	2,717·0	2,612·0	..	1,100·0	..	..	..	..	..	..	(BW) 1,512·0	
4 Ulundurpet Range.	1 Varanjaram	874·0	842·4	15·4	782·0	..	..	45·0	..	..	..	....	..
	2 Kallamedu	1,030·0	916·7	904·5	..	4·7	..	..	..	..	..	(G) 7·5	
	3 Kottalamalai	2,817·0	2,908·0	..	..	..	..	1,808·0	729·8	..	330·2	(K) 23·2	
												(T) 12·2	
												(P) 4·6	
	4 Thottapadi	1,048·0	1,518·5	4·7	63·9	..	..	1,406·7	..	..	..	(K) 33·0	
												(R) 8·2	
												(T) 2·0	
	5 Nangur	1,694·0	1,714·6	1·4	1,670·5	..	..	16·2	..	..	..	(P) 20·8	
												(K) 5·7	
	6 Magarur	1,263·0	1,199·4	..	1,088·7	..	..	4·3	..	..	..	(K) 106·4	
	7 Kattumailur and Extension.	1,775·0	1,841·6	4·9	1,832·1	..	..	..	..	..	..	(P) 4·6	
	8 Krishnapuram ..	6,044·0	5,998·9	15·0	..	..	..	5,497·0	..	..	..	(K) 486·3	
	9 Porasakurichi	7,823·0	798·2	..	675·0	..	..	59·4	..	..	..	(K) 63·8	
	10 Kuttadi..	1,700·0	1,871·1	1,683·2	..	26·2	..	..	38·2	33·0	90·5	....	
	11 Alwarmalai	8,795·0	6,591·2	165·6	5,247·2	..	..	..	1,042·8	..	..	(T) 14·0	
												(R) 121·6	
5 Tirukkoilur Range.	1 Ravuthanallur ..	1,164·0	1,137·8	..	680·9	..	..	..	188·7	..	249·8	(T) 18·4	
	2 Kanankadu	3,574·0	3,756·9	..	3,559·9	150·0	..	..	..	..	27·2	(T) 19·8	
	3 Kadavanur	4,065·0	4,093·0	..	3,981·9	..	..	..	..	..	111·1		
	4 Aviriyur	2,967·0	2,945·6	..	2,939·3	..	..	..	..	..	..	(T) 6·3	
	5 Swamimalai	4,262·0	4,233·4	..	4,113·3	..	..	..	..	..	..	(T) 105·4	
												(P) 14·7	

Note.—(*i*) Total of columns (5) to (13) will be equal to the figure given in column (4).

(*ii*) The expansion of the abbreviations used in column (13) is given below —

(S.A.) = Saline area. (K) = Kallar area. (B) = Blank area. (BS) = **Buildings.**

(B.W.) = Back-water. (G) = Gravelly area. (P) = Patta area.

(T.A.) = Tank bed area. (R) = Rocky area. (C) = Conservancy Block area.

APPENDIX XII.

Details of Control Records (vide *paragraph*).

CONTROL FORMS.

Form I.

Control of Regeneration and record of yield in Cashew Working Circle.

Name of series .

Prescribed.—One coupe in each series will be clearfelled in stripes and regenerated with cashew (*vide* paragraph).

Prescribed.			Done.		Remarks.
Year.	Name of reserved forest.	Area in acres.	Year.	Area in acres.	
(1)	(2)	(3)	(4)	(5)	(6)

NOTE.—Separate froms will be maintained for each series.

Form II.

Control of cultural tending in Cashew Working Circle.

Name of series .

Prescribed.—Cultural and tending operations will be carried out as prescribed (*vide* paragraph).

Prescribed.			Done.		Remarks.
Year.	Name of reserved forest.	Area in acres.	Year.	Area in acres.	
(1)	(2)	(3)	(4)	(5)	(6)

NOTE.—(i) A separate form will be maintained for each series.
(ii) Only the weedings during the first two years will be entered in this form.

Form III.

Control of harvest of Cashewnuts in Cashew Working Circle.

Name of the series .

Prescribed.—Sale of the usufructs of the cashew plantations from the sixth year onward (*vide* paragraph).

Prescribed.			Done.					Remarks.
Year.	Name of reserved forest.	Areas in acres.	Year.	Area in acres.	Yield.		Revenue realized in rupees.	
					Kind.	Quantity in tons.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

NOTE.—A separate form will be maintained for each series.

Form IV.

Control of Regeneration Operations in Rehabilitation Working Circle.

Name of the method .
Name of the regeneration technique .
Name of the series .

Prescribed.—One coupe in each series in each method and regeneration technique will be regenerated by the method prescribed for it (*vide* paragraph).

Prescribed.			Done.		Remarks.
Year.	Name of reserved forest.	Area in acres.	Year.	Area in acres.	
(1)	(2)	(3)	(4)	(5)	(6)

NOTE.—A separate form will be maintained for each series under each of the regeneration techniques and method.

Form V.

Control of cultural and tending operations in Rehabilitation Working Circle.

Name of the method

Name of the regeneration technique

Name of series

Prescribed.—Cultural and tending operations will be carried out as prescribed (*vide* paragraph).

Prescribed.			Done.		Remarks.
Year.	Name of reserved forests.	Area in acres.	Year.	Area in acres.	
(1)	(2)	(3)	(4)	(5)	(6)

NOTE.—Separate forms will be maintained for each series in each of the regeneration techniques and method.

Form VI.

Control of fellings and yield in casuarina working circle.

Name of series

Prescribed.—Clear-felling of the area prescribed for regeneration (*vide* paragraph).

Prescribed.			Done.					Remarks.
					Yield.		Revenue realized.	
Year.	Name of reserved forest.	Area in acres.	Year.	Area in acres.	Kind.	Quantity.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Form VII.

Control of regeneration in Casuarina Working Circle.

Name of series

Prescribed.—Casuarina plantations will be raised in the clear-felled areas (*vide* paragraph).

Prescribed.			Done.		Remarks.
Year.	Name of reserved forest.	Area in acres.	Year.	Area in acres.	
(1)	(2)	(3)	(4)	(5)	(6)

Form VIII.

Control of cultural operations in Casuarina Working Circle.

Name of the series

Prescribed.—Weeding, pruning and other tending operations will be carried out (*vide* paragraph).

Prescribed.			Done.					Remarks.
					Yield.		Revenue realized.	
Year.	Name of reserved forest.	Area in acres.	Year.	Area in acres.	Kind.	Quantity.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Form IX.

Control of fellings and yield in Fuel Working Circle.

Name of the series .

Prescribed.—Felling of fuel coupes (*vide* paragraph).

Prescribed.			Done.					
Year.	Coupe number.	Area in acres.	Year.	Area in acres.	Yield.		Revenue realised.	Remarks.
					Kind.	Quantity.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

NOTE.—A separate form will be maintained for each series.

Form X.

Control of collection of minor forest products in Minor Forest Produce Working Circle.

Prescribed.—Collection of minor forest produce in each range and the other units leased out annually to purchases (*vide* paragraph).

Prescribed.			Done.					
Year.	Lease unit.	Area in acres.	Year.	Area in acres.	Yield.		Revenue realised.	Remarks.
					Kind.	Quantity.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

NOTE.—Separate forms will be maintained for each range.

Form XI.

Plantation journal and ledger for Cashew Working Circle and Rehabilitation Working Circle. (*vide* paragraph).

1 Sketch of the plantation.
2 Series name.
(*a*) Area in acres.
3 Method of formation with dates.
(*a*) Cutting of planting line.
(*b*) Earth work as digging trenches for weathering soil, after aligning.
4 Method of planting with dates.
(*a*) Formation of sources or pits and dibbling—Cultural operation.
(*b*) Replacement of casualties.
5 Tending operations.
(*a*) Thinning.
(*b*) Miscellaneous.
6 Result of enumeration of survivals under dates.
7 Record of rainfall data monthly total and number of rainy days per month.
8 General notes on the condition of the plantations by the inspecting officers.
9 Plantation ledger showing monthly record of expenditure for the various items under which estimate has been sanctioned.

Form XII.

Plantation journal and ledger for Casuarina Working Circle (*vide* paragraph).

1 Sketch of the plantation.
2 Series name.
(*a*) Area in acres.
3 Method of formation with dates.
(*a*) Clear felling.
(*b*) Levelling, aligning and pitting.
(*c*) Digging wells.
4 Method of planting with dates.
(*a*) Filling pits and planting.
(*b*) Watering.
(*c*) Cultural operations.
(*d*) Replacement casualties.

5 Tending operations.
(a) Pruning.
(b) Miscellaneous.
6 Result of enumeration of survivals under dates.
7 Records of rainfall data, monthly total and number of rainy days per month.
8 General notes on the condition of the plantations by the inspecting officers.
9 Plantations ledger showing monthly record of expenditure. for the various items under which estimate has been sanctioned.

Form XIII.

Nursery Journal and Ledger.

1 Locality with a sketch.
2 Size of nursery.
3 Number of beds.
4 Size of beds.
5 Preparation of beds, including manuring.
6 Date of sowing and quantity of seeds sown.
7 Method and amount of watering and tending.
8 Dates of removal of plants and number of plants removed.
9 Cost of production of seedlings per 1,000.
10 Ledger cost.

	Cost of formation.					*Sowing.*		
Year and month.	*Levelling.*	*Fencing.*	*Manuring.*	*Formation.*	*Construction and repairs of wells.*	*Cost of seeds.*	*Sowing.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Form XIV.

Record of works.

	Prescribed.		*Done.*				
Year.	*Locality and kind of work with working plan paragraph number.*	*Unit or area.*	*Year.*	*Locality and kind of work with working plan paragraph number.*	*Unit of areas.*	*Cost.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

NOTE.—(i) Separate forms will be allotted to each working Circle including 'Miscellaneous' but not each series.

(ii) 'Measures prescribed', 'Measures suggested' and 'Measures carried out but not prescribed or suggested' will be maintained separately.

(iii Works 'prescribed' or 'suggested' but not allotted to any particular years will be given separately at the end of the entries for particular years.

Form XV.

Deviation statement.

	Reference to working plan.				
Serial number.	*Control form and page reference.*	*Paragraphs.*	*Prescription.*	*Nature of deviation.*	*Authority sanctioni.i*
(1)	(2)	(3)	(4)	(5)	(6)

Form XVI.

Financial statement.

Working circle.	Revenue. Working plan forecast.	Revenue. Actuals.	Revenue. Remarks.	Expenditure. Working plan forecast.	Expenditure. Actuals.	Expenditure. Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Form XVII.

Control Journal (combined for all working circles).

1 General— (a) Casuarina Conservation Working Circle; (b) Fuel Plantation Working Circle; (c) Manure Leaf Working Circle; (d) Grazing Working Circle; (e) Minor Forest Produce Working Circle; (f) Protection Working Circle; (g) Miscellaneous	Brief notes in narrative form regarding the suitability of areas allotted to each circle, work done during the year, arrears.
2 Regeneration— (a) Natural seedlings regeneration	Observations on important fuel species including mangrove species.
(b) Coppice regrowth in felled coupes; (c) Seed; (d) Nursery	Seed years, method of collection and storage seasons, sources, pretreatments, etc., nursery technique for important species.
(e) Clearfelling, burning and preparation of area.	General comments.
(f) Planting and sowing methods; (g) Weeding soil working and pruning	General comments.
(h) Watering casuarina plants	Remarks on quantity and frequency of watering.
(i) Dry technique of raising casuarina	Observations on success of raising casuarina without watering.
(j) Kumri regeneration	Kinds of field crops, their influences on seedlings, obligations of Kumridars earnest money deposits, etc.
3 Transport	Rates, seasons routes in respect of bullock carts, motor lorries and water transport through canals.
4 Market conditions	Brief notes on prices of casuarina and other jungle wood fuel in Madras, Chingleput, Tindivanam, Villupuram and Tirukkoilur and other centres.
5 Roads	General—Costs suggestions.
6 Buildings	Do.
7 Boundaries	Maintenance—Cost—Checking and verification—Compilation of register of reserved forests.
8 Injuries to the crop— (a) Fires. (b) Offences. (c) Insects. (d) Climates and other factors.	
9 Rainfall and climate	Brief notes for the division as a whole; statements of rainfall for all important revenue stations for the rain gauge stations.
10 Staff	Changes in strength of staff; possible lines of reduction of staff.
11 Labour	Daily rates of wages for men, women and boy coolies; outturn of work per day, for labour on artificial regeneration works compilation of forest schedule of rates for artificial regeneration works.

12	Contractors	List of standing contractors, their reliability and their good and bad works.
13	Camps.	
14	Shooting and fishing	Preservation of game.
15	Inspection notes on reserved forests ..	Complete file to be maintained.
16	Health	Brief notes with special reference to elephantiasis.
17	Experiments and research	Full details of observations and conclusions of experiments carried in the district, as also results of experiments of provincial silviculturist, where they are applicable to works in this division.
18	Miscellaneous.	
19	Financial results	Furnish financial statement for the year with suggestions for augmenting Revenue and reducing expenditure, so as to make the division self-supporting.

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